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Number 3.

DECEMBER, 1903.

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TEXTILE WORLD RECORD

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Traveler's Edition, $2.00.

The Textile-Finishing Machinery Co.

17 EXCHANGE PLACE, PROVIDENCE, R. I.

Mercerizing Machinery for Piece Goods and Yarn in the warp or chain

Singeing Machines,

Boiling Kiers,

Washers, Squeezers,

Chemic and Sour

Rusden Patent

Continuous Chainless

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Aniline Agers,

Dyeing Machines,

Open Soapers,

Blanket Washers,

Color Kettles,

Horizontal or Vertical Drying Machines, with Copper or Tinned Iron Cylinders,

Automatic Tentering Machines,

Water and Starch Mangles,

Dampening Machines,

Dyeing Machines for Chain Warps.

BUILDERS OF ALL KINDS OF

MACHINERY

FOR

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DYEING

DRYING

AND

FINISHING

Calenders for Rolling, Glazing, Chasing and Embossing, also Calenders for Moire Finish.

Patent Combination Rolls made of Cotton and Husk especially adapted for Soft Finish, Unequalled for Elasticity and Durability.

Cotton, Paper, Husk, Chilled Iron, Brass and Rubber Rolls, Electro-deposited Copper Rolls for all Purposes.

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Estimates, drawings and full particulars of complete plants furnished on application

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DRYING AND
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MACHINERY

Drying Machines with Copper and Tinned Steel Cylinders.

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Tentering Machines for Ginghams, Plaids, Etc. Tentering Machines for Worsted and Woolen Goods. Tentering Machines for Lawns, Etc. and having Patent Vibratory Motion. The above with either pin, spring clamp, or patent automatic clamp chain.

MERCERIZING MACHINES

FOR YARN AND CLOTH.

PATENT WINDING MACHINE

(W. P. Simpson, Patentee).

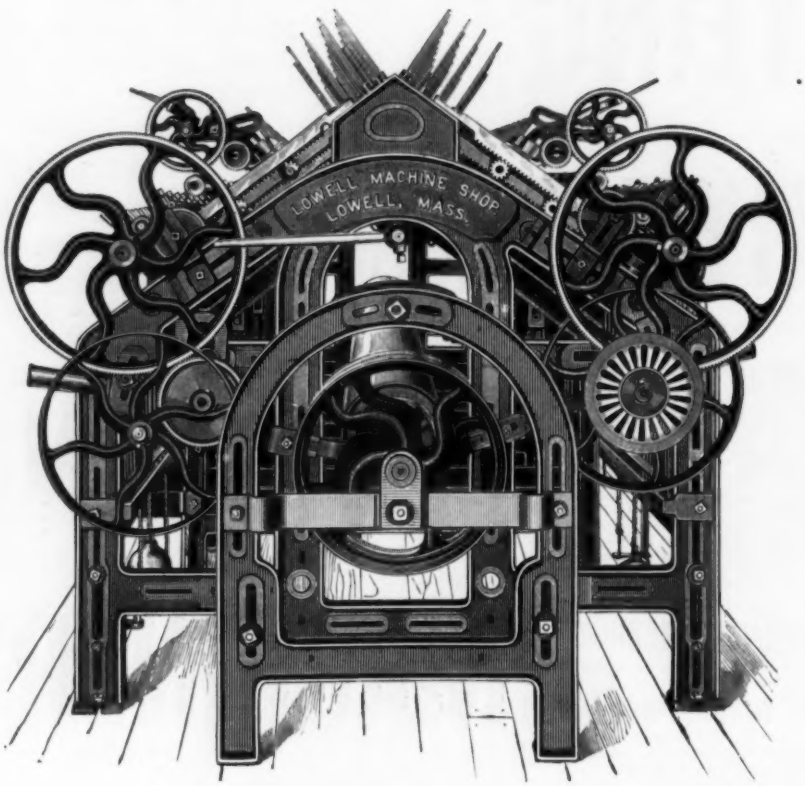
For use in connection with Singeing Machines, Soaping Machines, Drying Machines, Etc.

H. W. Butterworth & Sons Co. Philadelphia, Pa.

Worsted Machinery

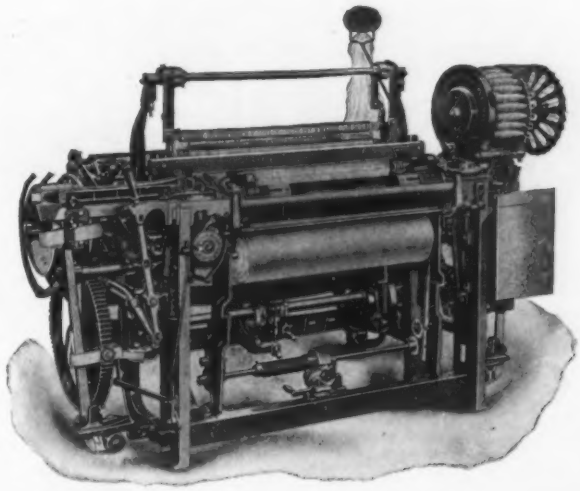
MADE IN THE

United States



Lowell Machine Shop

LOWELL, MASS.



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DESIGNED exclusively for Print Cloths and similar light fabrics. Will weave without a thick or a thin place. Can bang off without shock. Has the large hopper, the Draper-Roper let-off, a new take-up and a new warp stop knock-off.

Large orders now being filled by the

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OUR LATEST!

AUTOMATIC FILLING STOP MOTION

This attachment will positively stop the loom just before filling runs out, leaving absolutely no mispicks, and it can be attached to any loom.

It can be seen in operation at our works, where we have also on exhibition our

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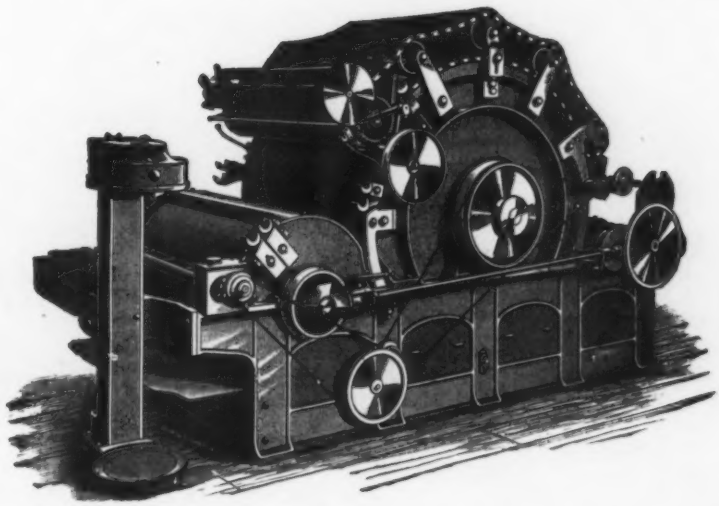

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Drawing Frames, Spinning
Frames, Mules and
Looms,

INCLUDING

Plain and Fancy Silk Looms

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THE

WHITIN MACHINE WORKS,

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Trust Building, CHARLOTTE, N. C.
and Equitable Bldg, ATLANTA, GA.

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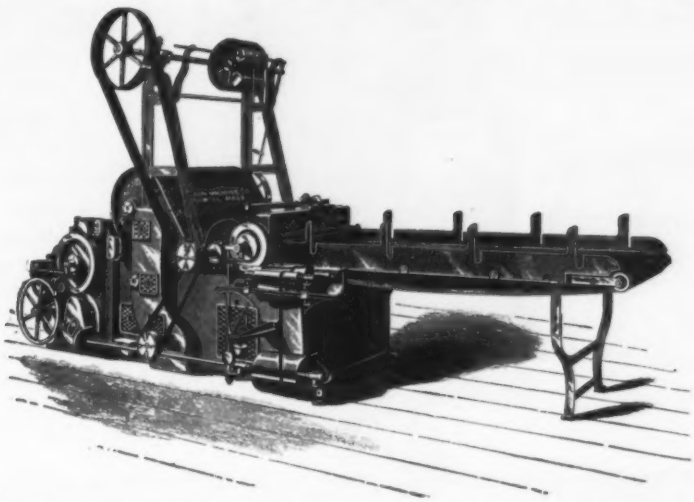
Sliver Lap Machines,
Ribbon Lap Machines,
Combers,
Railway Heads,
Drawing Frames,

Spinning Frames,
Spoolers,
Twisters,
Reels,
Looms,
Long Chain Quilling Machines.

The Best Pickers

In the Cotton Field nothing equals the DARKY COTTON PICKERS.



In the Cotton Mill nothing equals the KITSON COTTON PICKERS.

KITSON MACHINE CO., LOWELL, MASS.

LARGEST BUILDERS OF COTTON OPENERS AND LAPPERS IN THE WORLD.

STUART W. CRAMER, Southern Agt., Charlotte, N. C. and Equitable Bldg., Atlanta, Ga.

SCOTT & WILLIAMS

BUILDERS OF

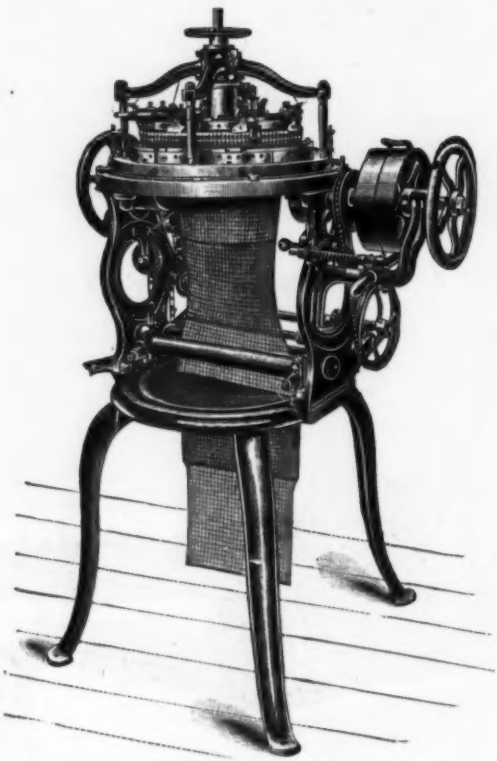
RIB KNITTING MACHINERY

FOR UNDERWEAR AND HOSIERY

The illustration shows our

Improved High Speed Single Lever Automatic Ribbed Underwear Machine

for making ladies' and gents' ribbed underwear, union suits, etc., plain and shaped.



Plain, Single Lever, or with Welt, Slack Course and Automatic Slackening Device for Welt.

Improved Measuring Device, by actual length knit.

Sizes, 8 to 24 inches, inclusive, varying by one inch.

Number of Feeds, four to twelve, according to style and diameter of machine.

Solid Forged Steel Cylinders, specially hardened, or with patent inserted walls for fine fabric.

Special Machinery for Sweaters, etc.

We build Loopers, Ribbers and other Machinery for Knitting Mills.

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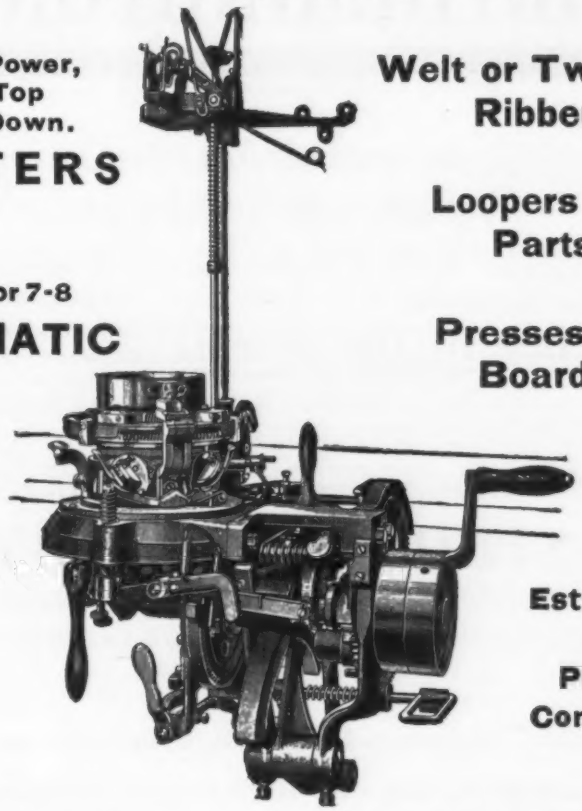
AUTOMATIC KNIT-TERS

All Sizes and All Gauges.



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reduces the danger from fire in the mule head to a minimum, and makes

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None better in the world!

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Improved Heilman Combers. Over 4,000 running in U. S. A.

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Platt's New Patent Cotton Comber will comb from 7-8 in. stock to Sea Islands.
Platt's Special Machinery for Making French Worsted Yarns.
Platt's Special Machinery for Making Cotton Waste into Yarns.
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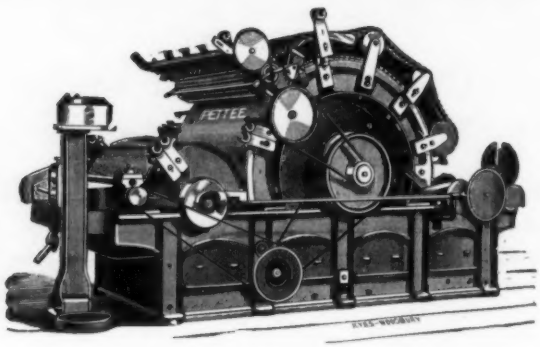

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Increases Production,
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THE BRAMWELL FEEDER (over 12,000 now in use.)
For Woolen, Worsted, Shoddy and Hosiery CARDS and GARNETT Machines.

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For Second Breaker and Finisher CARDS.

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THE NEW 1902 BRAMWELL OPENER AND FEEDER,
A Complete Machine. For Wool Washers and Wool Dryers.

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Send for Sheet of Testimonials. Saves Oil, Labor and Waste.

A NEW CLUTCH ATTACHMENT FOR BRAMWELL FEEDERS,
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DR. J. B. HARRIS' SYSTEM

Absolute Combustion of Soft Coal in Steam Boiler Furnaces. . . . NO SMOKE!

Saves Fuel.

Flues and Sheets Always Clean.

Gives Higher Evaporation.

Burns Any Kind of Fuel.

Low in First Cost.

Repairs Nominal and Easily Made.

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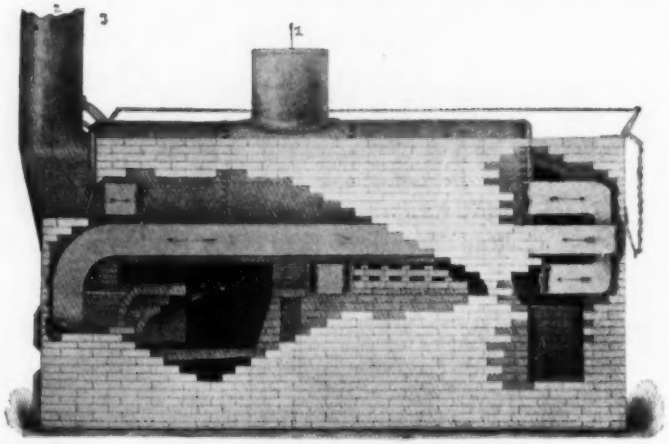
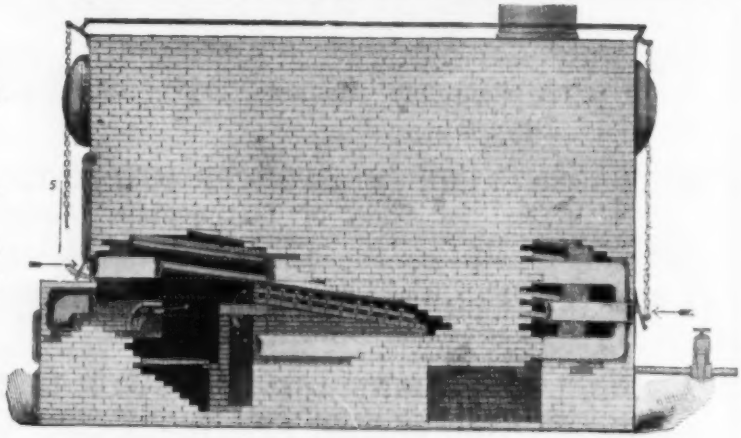
Burns Crude Oil Without Smoke or Odor.





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INTERNATIONAL STEAM ENGINEERING COMPANY.
NEW YORK: 1110 Washington. Life Bldg., 141 Broadway. ATLANTA, GA., 528-9 Prudential Building.
W. G. & G. GREENFIELD, Greenfield Steam Engine Works, 5th and Cross Streets, EAST NEWARK, N. J.
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Catalogue free of nearest agent or address

J. B. HARRIS, M.D., Inventor and Patentee,
71 Arcade, NASHVILLE, TENN.

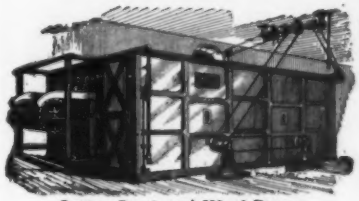
"HURRICANE"
DRYERS AND FANS

For WOOL,
COTTON STOCK,
YARN, STOCKINGS,
UNDERWEAR,
Etc.

Truck Yarn Dryer.

Write for Booklets.

"Hurricane" Fan, Style No. 2.



Cotton Stock and Wool Dryer.

CARBONIZING

Outfits for Wool,
Noils, Rags and Cloth.

PHILADELPHIA DRYING MACHINERY CO.

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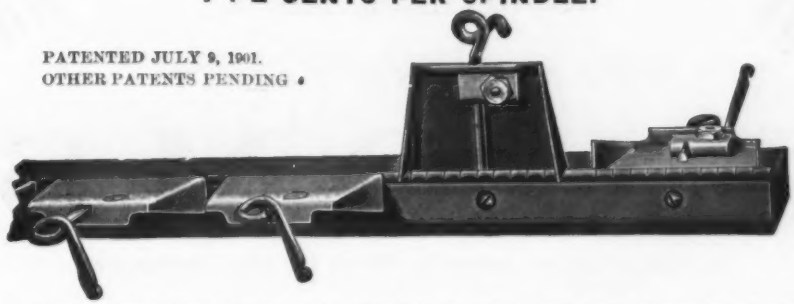
HOUGHTON'S
ALL STEEL THREAD BOARD

with Hardened Thread Guides.

7 1-2 CENTS PER SPINDLE.

PATENTED JULY 9, 1901.
OTHER PATENTS PENDING.



The only Thread Board that *holds a guide solid* all the time; *never* gets loose; is always in perfect adjustment, and thus must make a saving in travelers, broken ends, waste, thread guide, care and also prolong the wear of rings and increase the production per spindle. These claims are based on the truth of mechanical principles, and have been proven true by actual use in many mills whose superintendents will substantiate these claims.

L. T. HOUGHTON, Sole Manufacturer, WORCESTER, MASS.

THE

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The Leading Manufacturers of

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THE GEO. W. STAFFORD COMPANY

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PLAIN AND FANCY

LOOMS

For Silk or Cotton; Automatic Filling Changing Mechanisms,

DOBBIES

Warp Stop Motions.

Fabric Measuring & Packaging Co.

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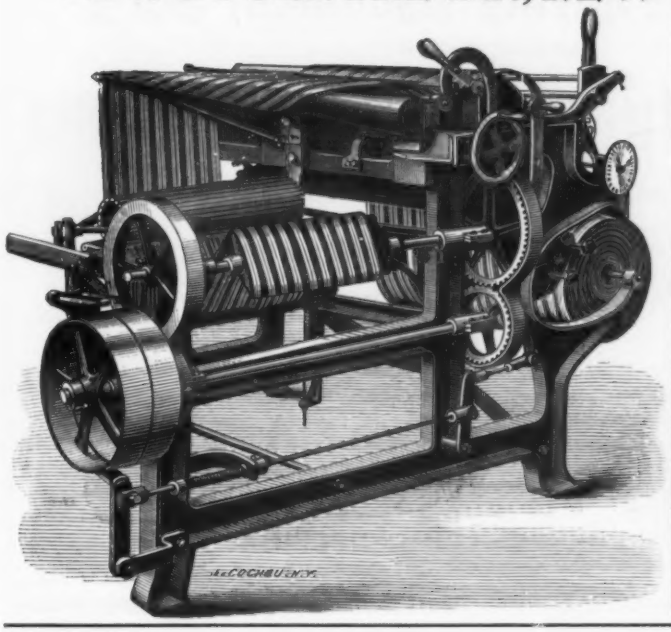

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On Cottons, Woolens and Carpets.

Machines to Measure

and imprint the measurement upon fabrics, fold lengthwise and roll into merchantable packages all in one operation.

Prevents claims for short measure.
Marks piece numbers on each package.

A Fully Equipped Machine Shop for General Work.

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Winding, Coiling, Hanking and Laying

MACHINERY FOR CORD AND ROPE.

JOSHUA GARSED'S PATENT MACHINE

For winding cord or rope on paper tubes, 6 to 20 inches in length. . .

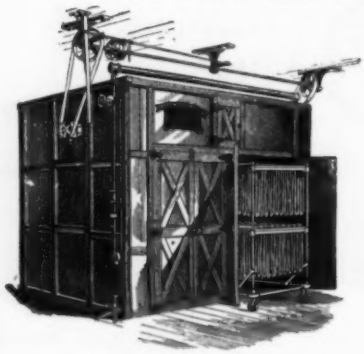
ALSO, GIMP WINDING MACHINES.

AMERICAN DRYING MACHINERY CO.

MANUFACTURERS OF

"20th Century" Drying Machines

FOR WOOL, COTTON, STOCK, YARNS, HOSIERY AND UNDERWEAR.



TRUCK YARN DRYER.

Carbonizing Plants Complete;
Yarn Scouring Machines,
Ventilating Fans, Etc.

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CORRESPONDENCE SOLICITED.

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LAWSON BRANCH,

Hope Foundry. LEEDS. England.

MAKERS OF MACHINERY FOR

PREPARING AND SPINNING FLAX, HEMP, TOW AND JUTE

AND OF

Special Machinery for the Manufacture of Twines,

ALSO OF

GOOD'S COMBINED HACKLING AND SPREADING MACHINE,
LONG REACH SCREW-GILL DRAWING FRAMES,
CHAIN-GILL DRAWING FRAMES with Apron Head,
PATENT HIGH-SPEED HORIZONTAL AND AUTOMATIC SPINNING FRAMES FOR MANILLA,
AND OTHER
Special Machinery for the manufacture of Rope Yarns and Binder Twine.

IMPROVED LAYING MACHINES. HASKELL-DAWES TUBING TWISTERS

BROWNELL'S PATENT TWISTING AND LAYING MACHINES FOR TWINE.

Complete Plans and Estimates for Flax, Tow, Hemp and Jute Mills, Trawl Twine Factories and Steam Ropeworks.

The Oil Manufacturers

do not like

Cross Oil Filters

because it cuts their receipts in half.

The Fairbanks Boston Rim Co., Bridgeport, Pa., says: "Immediately after our engineer had the **Cross Oil Filter** in position we commenced *using less oil than before, so much* less in fact that the manufacturer from whom we had previously purchased about two barrels of oil per month, and with whom we had always been on friendly terms, accused us of buying our oil elsewhere, as indeed he had reason to believe we were from the fact that the orders he received from us dropped off about one half after putting in your Filter." Let us send the

CROSS OIL FILTER

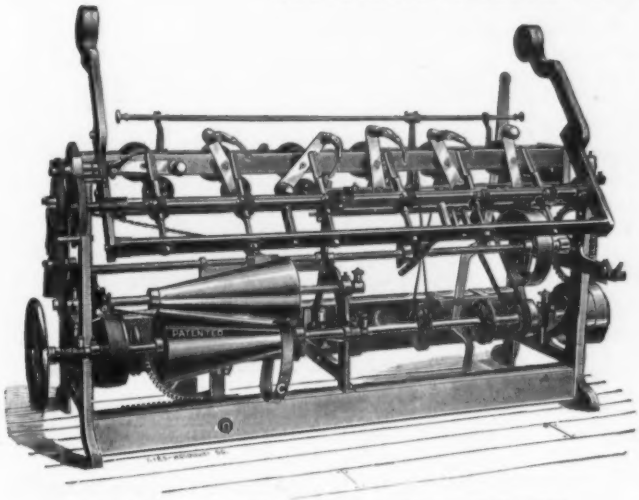
on thirty days' trial. If unsatisfactory return at our expense.

The BURT MFG. CO. AKRON, OHIO, U. S. A.

LARGEST MANUFACTURERS OF OIL FILTERS IN THE WORLD.
SUPPLIED ALSO BY OIL COMPANIES, ENGINE BUILDERS AND POWER CONTRACTORS.

NORTH CHELMSFORD MACH. CO.

Successors to SILVER & CAY CO.



MANUFACTURERS OF

BALLING MACHINES,
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REELS,
BALING PRESSES
AND
SPECIAL COTTON
MACHINERY.

SPECIAL—AUTOMATIC BALL WINDER.
Adapted to All Kinds of Twines, Silks and Floss.

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ALBERT BIRCH,
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WORKS ON LINE OF FITCHBURG RAILROAD
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to which place please address your enquiries.

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SOMERVILLE MACHINE WORKS,

WOOLEN and WORSTED FINISHING MACHINERY

And also for

BLEACHING, DYEING, DRYING and FINISHING COTTON GOODS.

Send for Circulars and Prices.

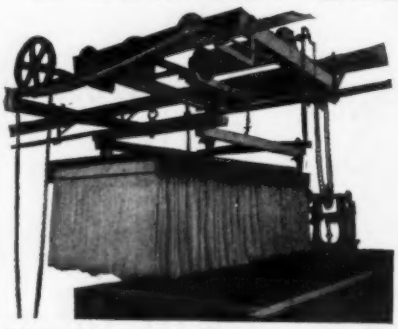
SOMERVILLE, MASS.

The Hussong Dyeing Machine

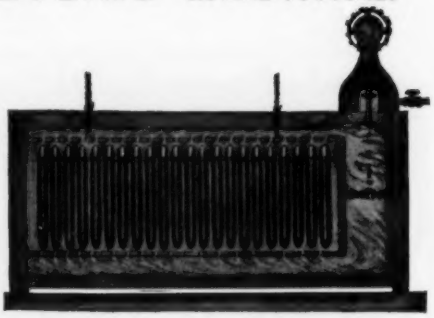
Patented Nov. 6, 1900. April 9, 1901.

For Dyeing both Alizarine and Acid Colors on Yarn.

A PERFECT SKEIN DYEING MACHINE.



This illustration shows our Compressed Air Hoisting Carriage, with 300 pound Yarn Machine suspended.



Longitudinal Sectional View, showing the circulation of dye-liquor through the yarn when in operation.

Points of Superiority Which We Claim for the Hussong Machine.

Durability, Even Dyeing, Saving of Steam, Saving of Dyestuff,
Saving of 75% in Labor, Makes No Waste Whatever, No Friction on the Material,
Requires but Little Power to Operate,
Leaves the Yarn and Slubbing in its Natural Condition.

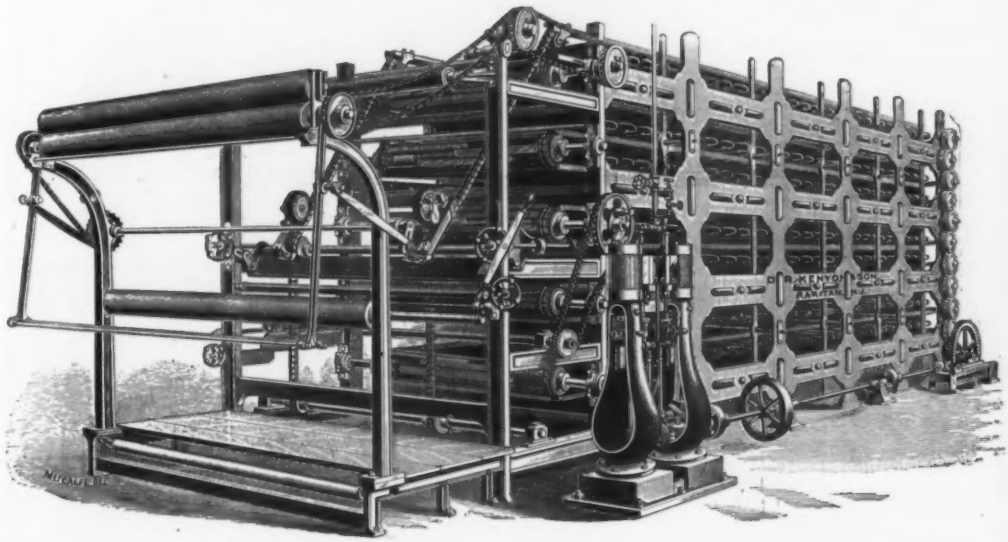
Built by the **AMERICAN DYEING MACHINE COMPANY, Office 609 Pearl St., Camden, N. J.**

Reference Given on Application.

Tentering and Drying Machines

WITH LOW DOWN FEED. PATENTED FEBRUARY 26, 1895.

Tentering and Drying Machines on Pipe System. Special Dryers for Heavy Felt Goods. Hot Air Drying and Tentering Machines.



Fulling Mills, Washers, Chinchilla and Whitney Machines, Whipping Machines, Cone Willows, Marsden & Blamire Lap Feed, Dyeing Machines for Piece Goods, Soaping Machines, Wringing Machines, Jigs, (double or single,) Dewing Machines, etc.

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D. R. KENYON & SON,

SUCCESSORS TO KENYON BROS.

Long Distance Telephone, Somerville 40-B.

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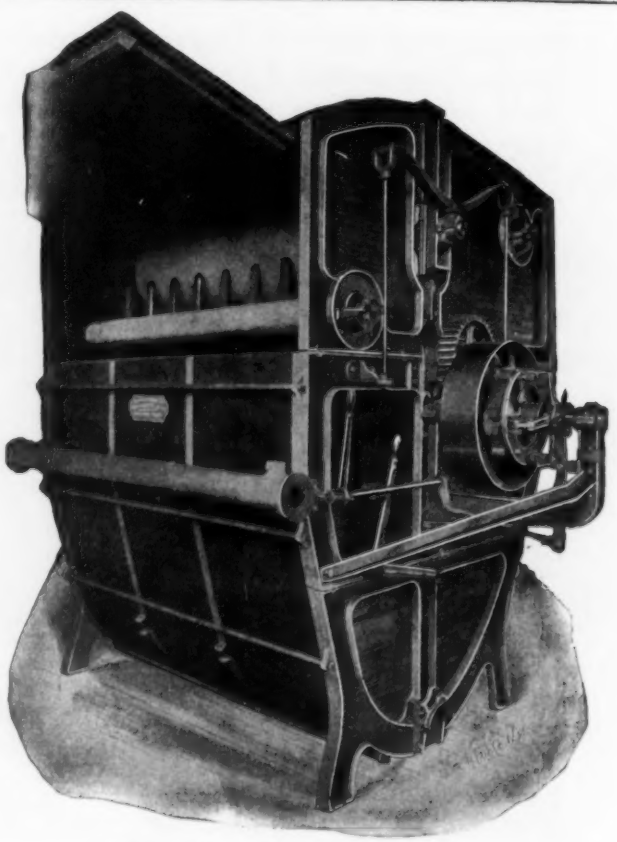
Horizontal and Vertical.
Iron Flumes.
Rotary Fire Pumps.
Centrifugal Pumps.
Head Gate Apparatus.
Water Wheel Regulators.
Rotary Fulling Mills.
Rotary Cloth Washers.
Endless Felt Washers.
Endless Felt Fulling Mills.
Rotary Knit Goods Washers.
Combined Fulling Mill
and Washer for Knit Goods.
Hammer Falling Stocks.
Dolly Washers.
Crank Fulling Mills.
Crank Knit Goods Washers.
Hydro-Extractors.
Reel Dyeing Machines.
Carbonizing Machines.
Bleaching Machines.
Dye Tubs and Rinsers.
Wool Washers.
Soaping Machines.
Cloth Winders.

New Rotary Cloth Washer



Type C. For All Fabrics.

Improved Attachments for Fulling and Washing Knit Goods in the roll. Is fully described in Circular No. 10.

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70 KILBY STREET,
Telephone No. 1522.

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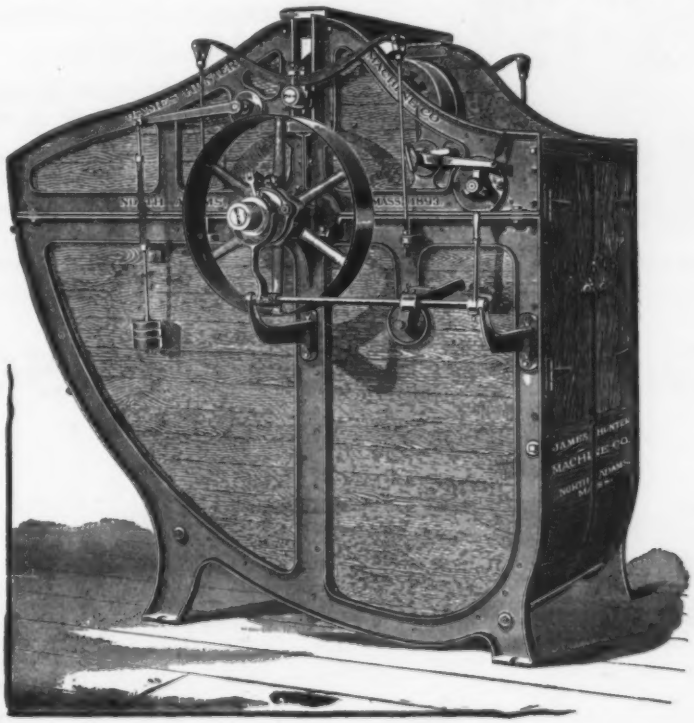
Automatic Wool Washers

PARALLEL RAKE

The "STONE DRYER," for Wool, Cotton, Rags, Etc.
CARBONIZING MACHINERY, ETC.



Fulling Mills, Cloth Washers,
WOOL OPENERS, SELF FEEDS, DUSTERS

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Dye Tubs, Vats,
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Send for Catalog, Prices, and also ask about our Fulling Mill for extra heavy goods and blankets.

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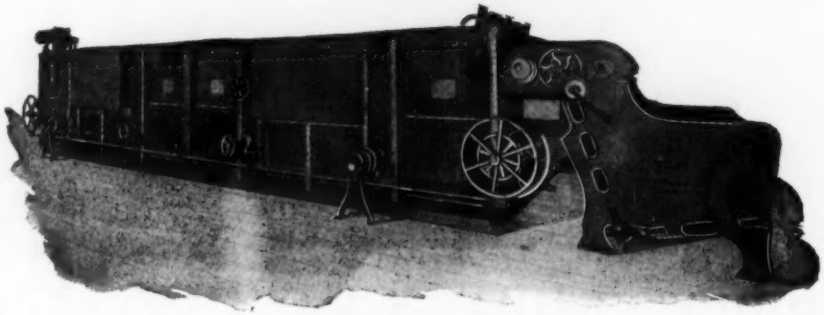

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Stock Dryers, Wool Washers,
Wool Dusters, Carbonizing Plants,
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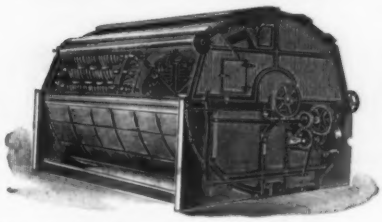
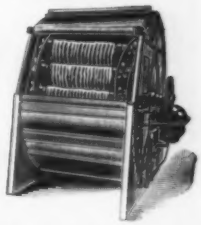
SKEIN AND SLUBBING MACHINES.



SAVES
75 per cent in Labor,
30 per cent in Winding,
Steam and Dye Stuffs,
Perfectly Even Dyeing.

CAPACITY:
50 to 700 pounds per batch.



No Friction on the Skeins. No Tangling of the Yarn.

Universally Used.

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BUILDERS OF MACHINERY FOR DYEING, BLEACHING AND MERCERIZING.

For Skein—Worsted, Slubbing, Cotton and Silk.
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" Garments—Underwear, Hosiery, Hats and Caps.
" Sulphur Colors—Skein, Raw Stock and Hosiery.
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RAW WOOL AND COTTON MACHINES.

SAVES
50 per cent in Labor,
besides Steam and Dye Stuffs.
Practically Indestructible.

CAPACITY:
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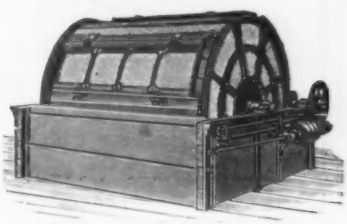

Leaves Stock in Perfect Condition. Does Not Mat or Tangle the Fibre.

A Perfect Machine.

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Builders of Textile Machinery

FILLING COP WINDING MACHINES. Spindles driven by belts or by gears, and bobbins can be made to wind any kind of filling from the coarsest to finest numbers, from Skeins, Spools, Cones, Mule Cops, or any other Spinning or Twister Bobbins. These machines can be arranged to wind cops or butts from the largest used in weaving to the smallest cops or butts for cotton filling used in the silk trade.

OUR MACHINERY PUTS YARN IN CONDITION FOR MANUFACTURING AS SHOWN ABOVE.

BANDLESS SPINDLE SPOOLING MACHINES; adapted to the finer grades of yarn and to the finest silk. ***PRESSER DRUM SPOOLING MACHINES;*** arranged to spool in any way the trade requires. ***BANDLESS VARIABLE SPEED MACHINES;*** to wind the large bobbins used in knitting mills. ***CONICAL AND STRAIGHT TUBE WINDING MACHINES; BRASS BOBBIN WINDING, SPOOLING, WARPING*** and other machinery for lace mills. Beaming Machines, Sectional Warp Mills, Chenille Cutting Machines, etc., etc.

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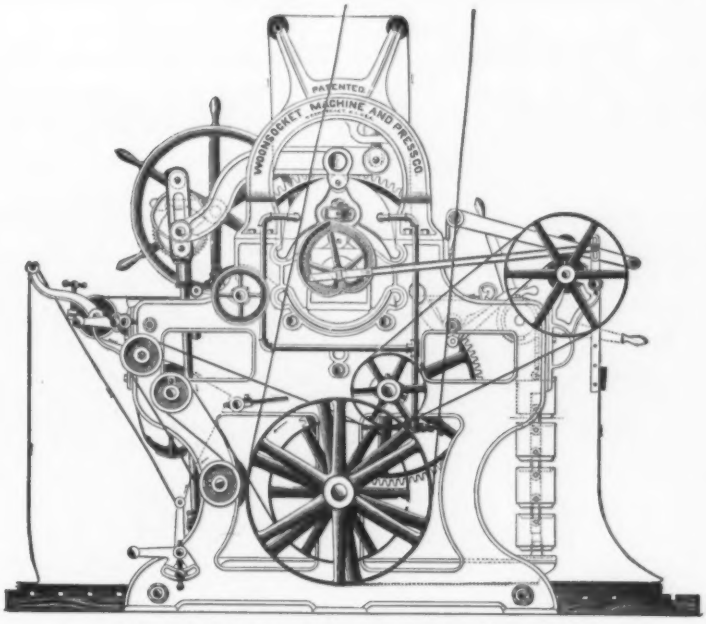
PERFECT TEMPERATURE, POWERFUL, SIMPLE



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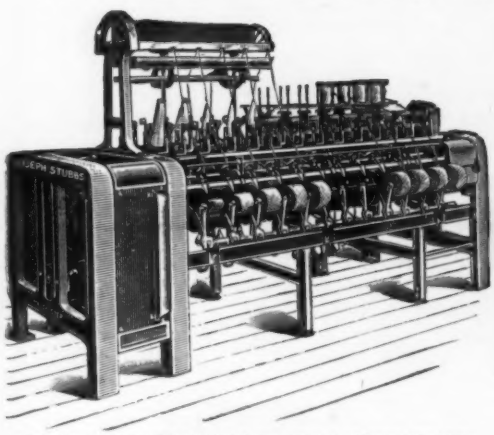

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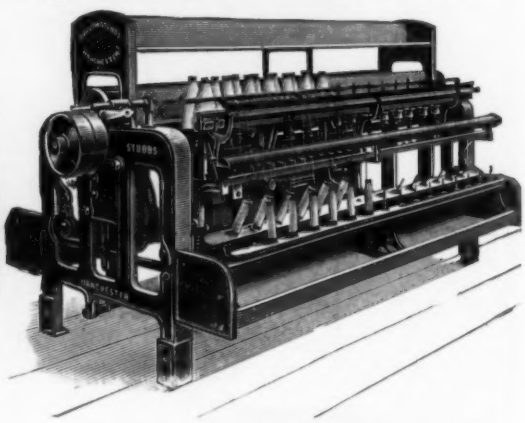

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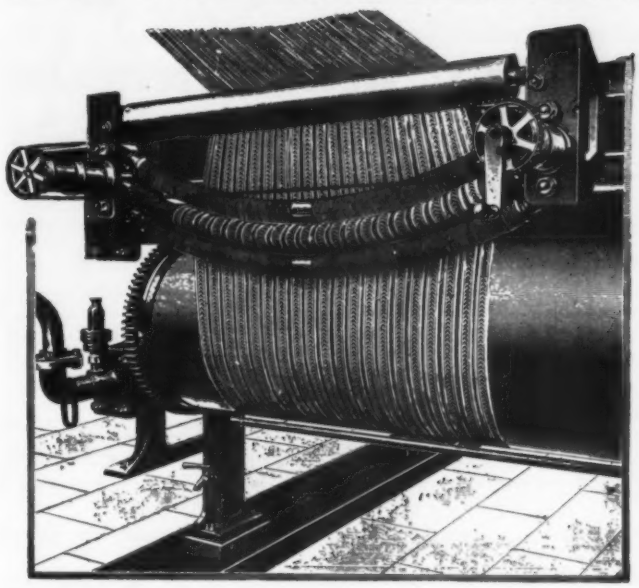

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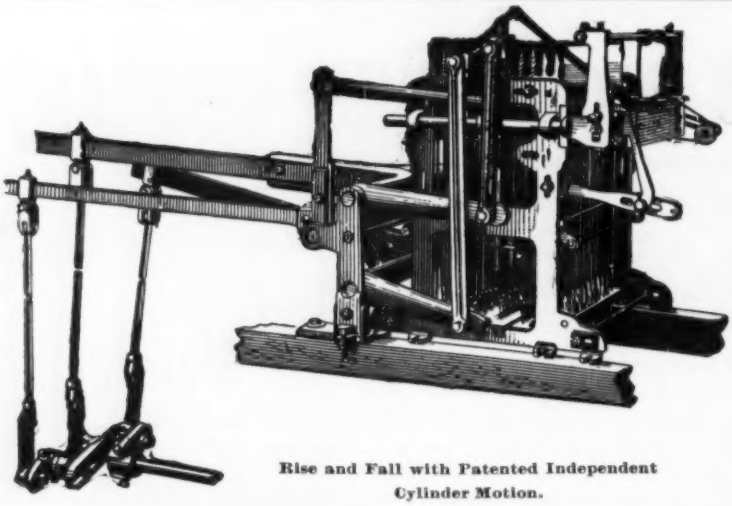

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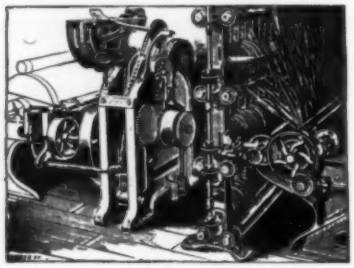

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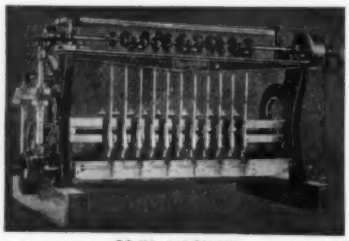

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Repairs and new parts for curled hair machinery. Fallers of every description made. Change Gears, 5-8, 7-16, 3-8 and 1-4 inch pitch kept on hand. All kinds of new Fluted Rollers, for Combs, Gills, Drawing and Spinning; also Refluting old ones. Improved Roller Covering Machine.

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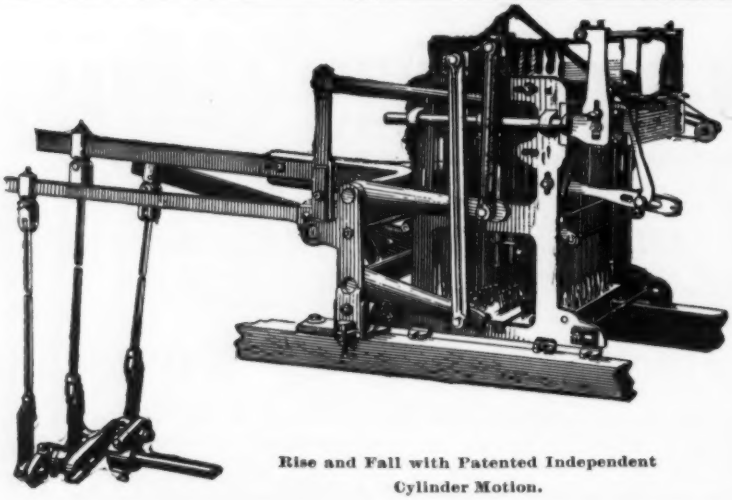

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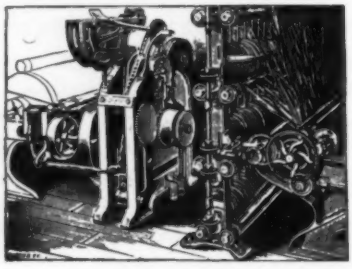

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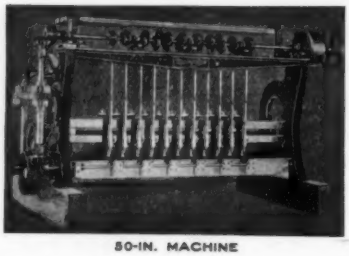

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on the part of the Engineer, makes great economies in the running of a Plant, particularly if assisted by a

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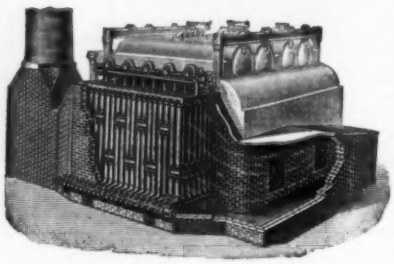

which is the greatest assistant to true economy yet produced. The gain in steam, with the corresponding reduction of fuel, seems incredible, but with our Economizer you can easily save from 10 to 20% in Fuel, and yet, through the use of waste gasses entirely, keep the feed-water heated above the boiling point. What this means to the **Textile Mill, Bleacheries** and **Dyehouses,** is best ascertained through the testimonials of those having one in their boiler room. Our booklet, sent free, shows not only how it is done, but gives you a list of users, and their testimonies as to the value to them. Our great advantage—applied without stoppage to works Write us for plans and specifications.

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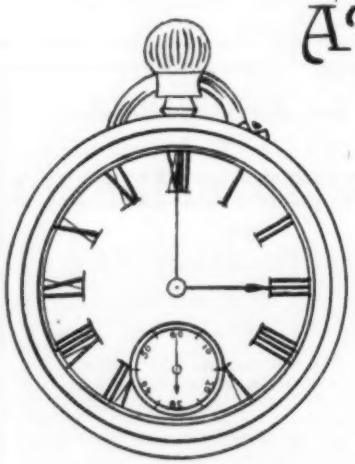
Sole Manufacturers in the U. S. A. **Matteawan, N. Y.**

Deliveries always on Time



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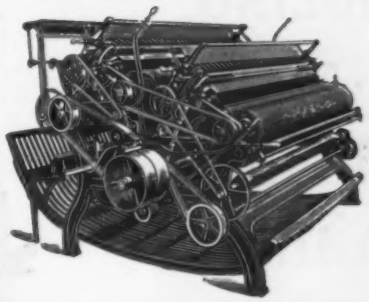

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No. 9—Portable Foot-Power Rotary Sewing Machine.

It is especially adapted for use in Cotton and Woollen Mills, Bleacheries, Print Works at the Printing Machines, in Dye Works, Cloth Rooms, at the Fulling Mill, Shears, Calendars, Gigs, Drying Machines, etc., or any of the different finishing processes in textile mills.

Manufactured by the

DINSMORE MANUFACTURING CO.,
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LATEST MILLER ROTARY STEAM CLOTH PRESS.

Patent Flexible Steel Bed. Pressure automatically applied by power.
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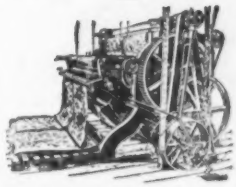

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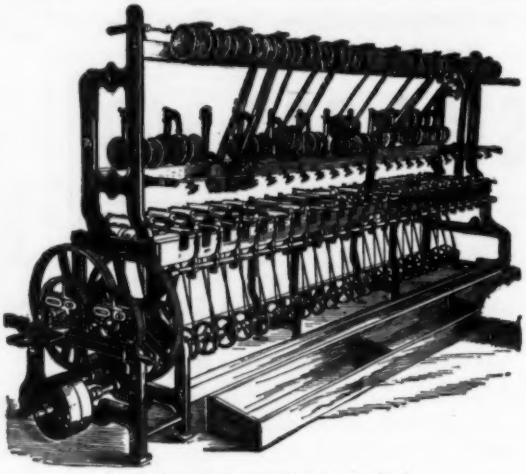
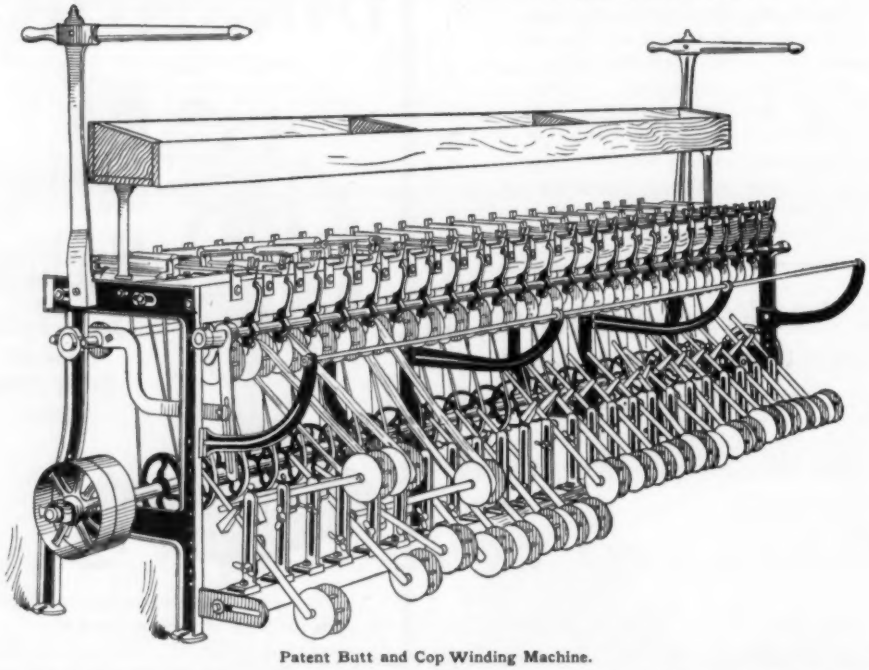


Patent Shuttle Bobbin Winder for Skeins, with Patent Variable Motion.



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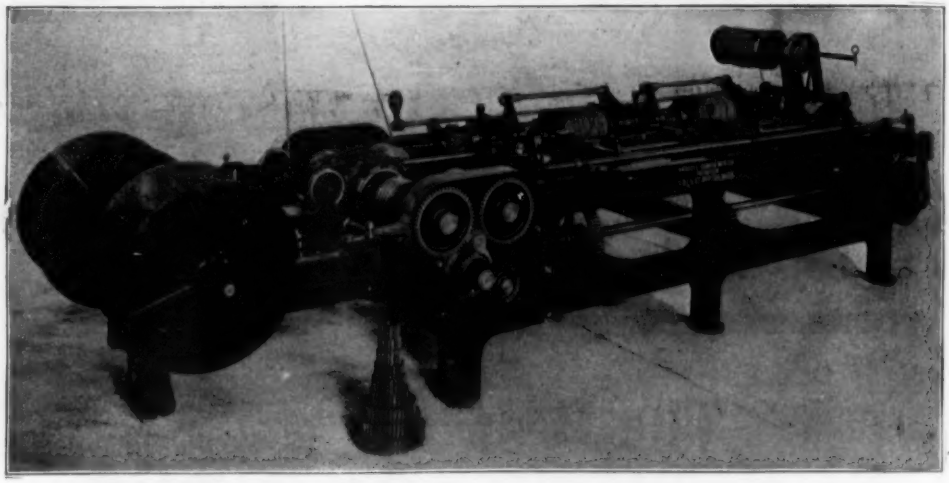

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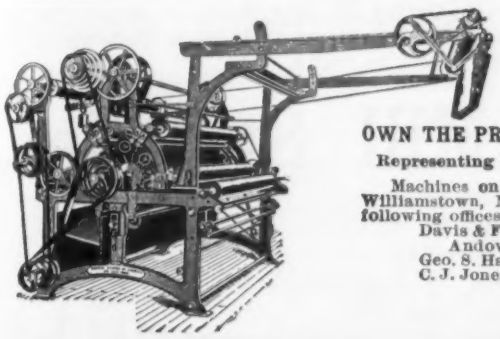

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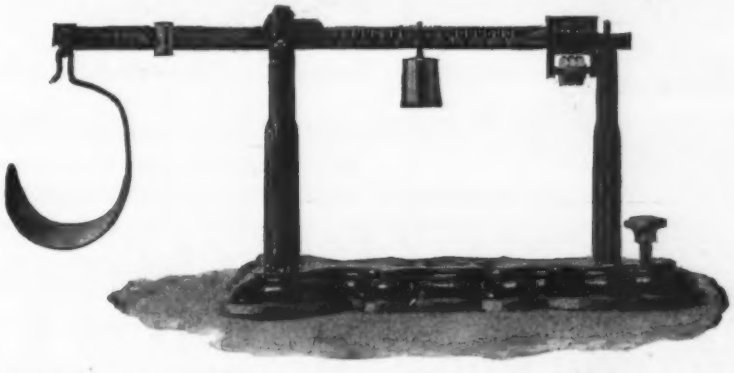

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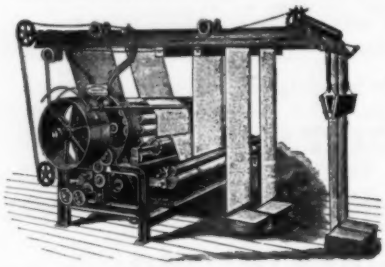

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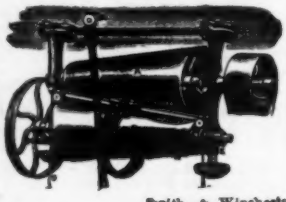

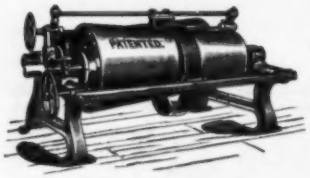

Smith & Winchester Co., So. Windham, Conn., 250 sets. Furguson & McRae, Belfast, Ireland, 25 sets. Mercantile Laundry, So. Windham, Conn., 250 sets. Washburn & Moen, Worcester, Mass., large number, all sizes. Dennison Tag Co., Boston, Mass., large number, small sizes. Saco & Pettee Machine Co., Newton, Mass., 375 sets. Pacific Mills, Lawrence, Mass., 13 sets.

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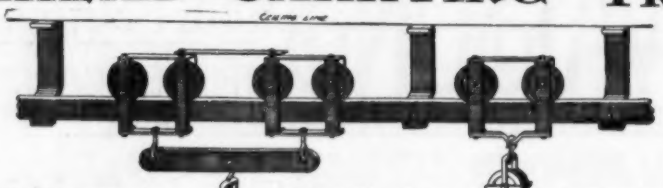

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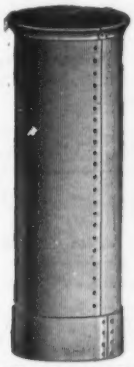

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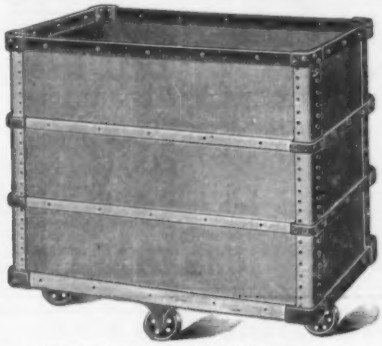

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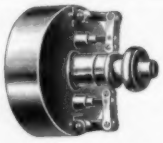

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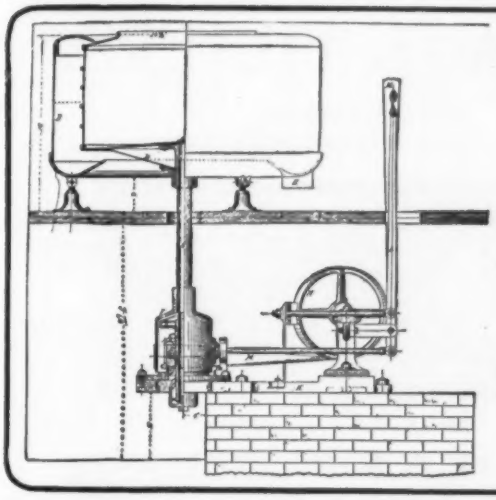

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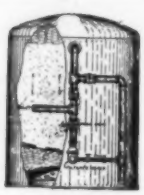

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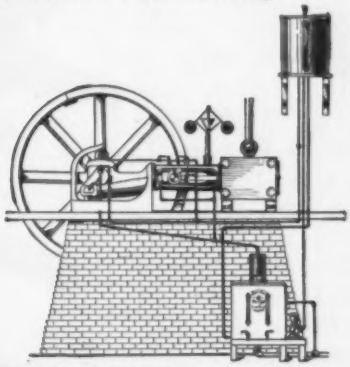

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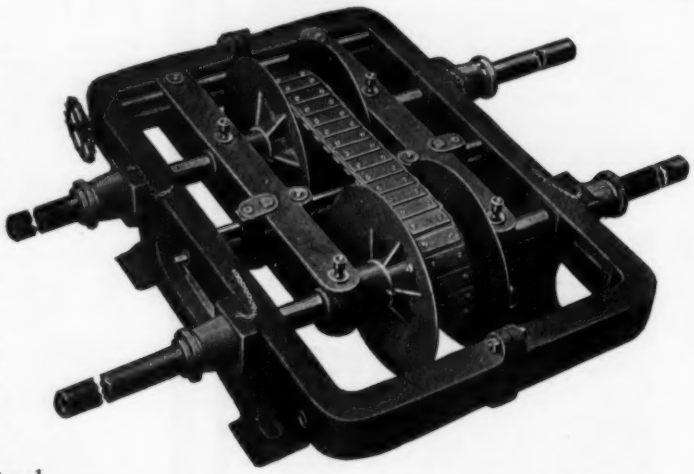

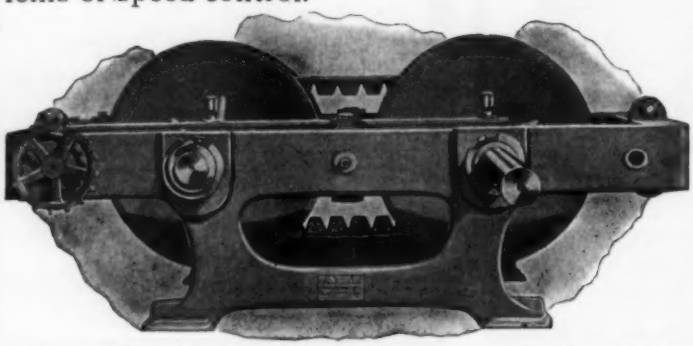

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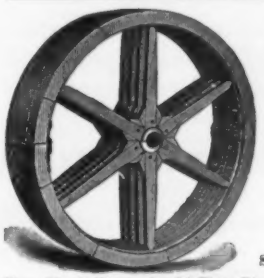

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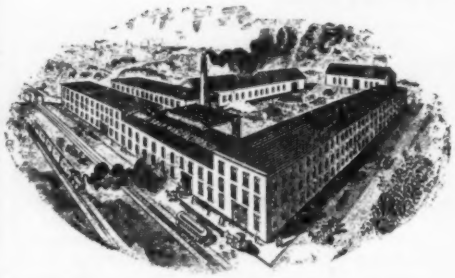

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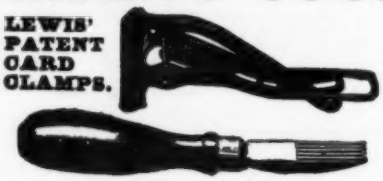

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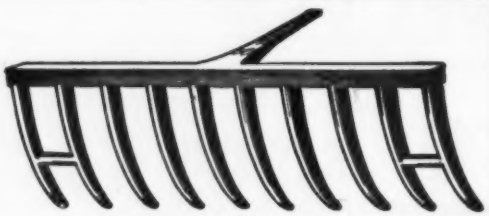

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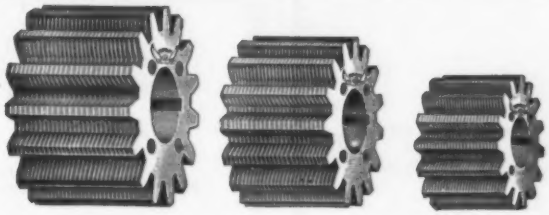

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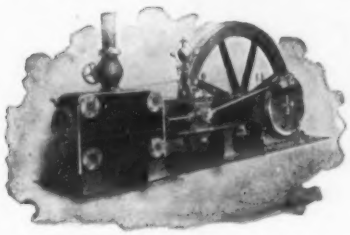

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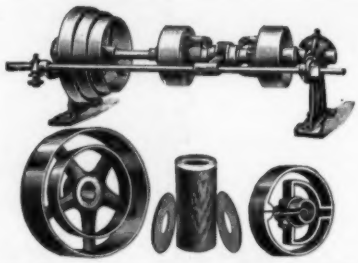

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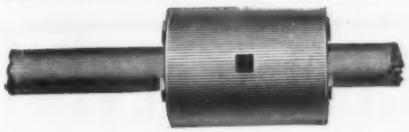

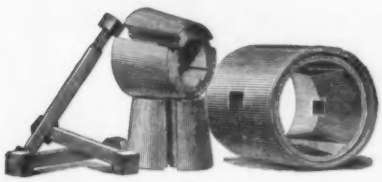

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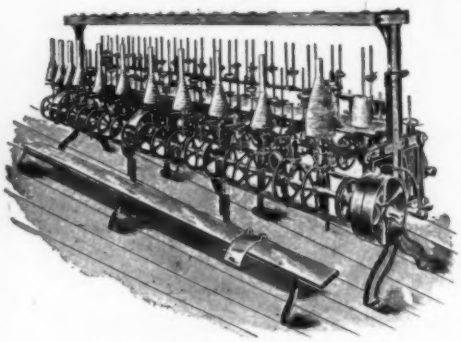

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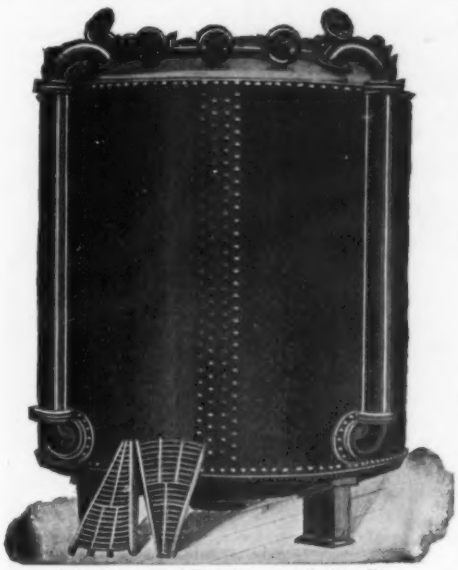

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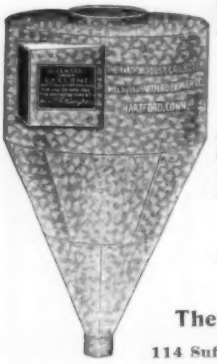

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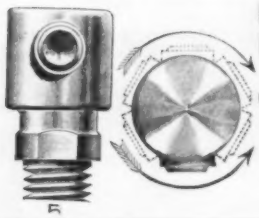

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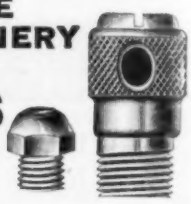

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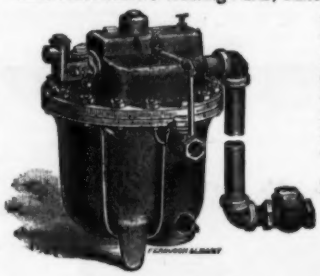

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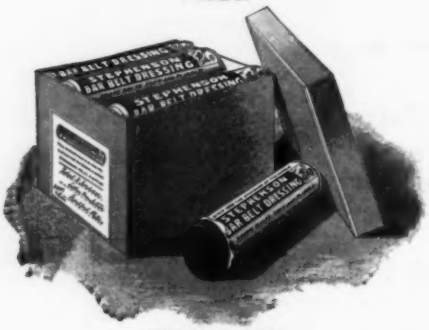

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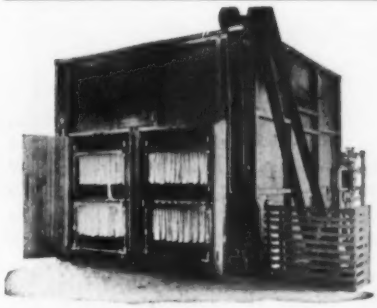

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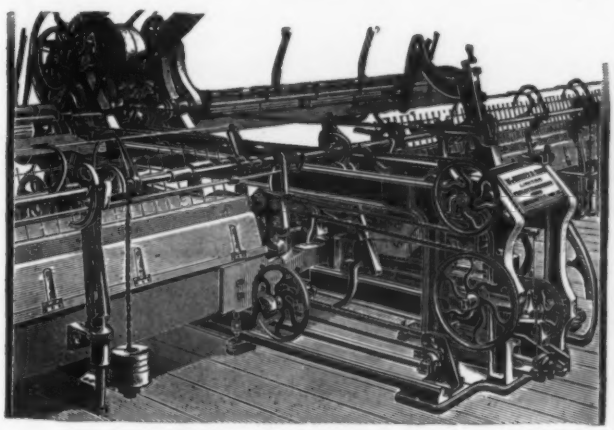

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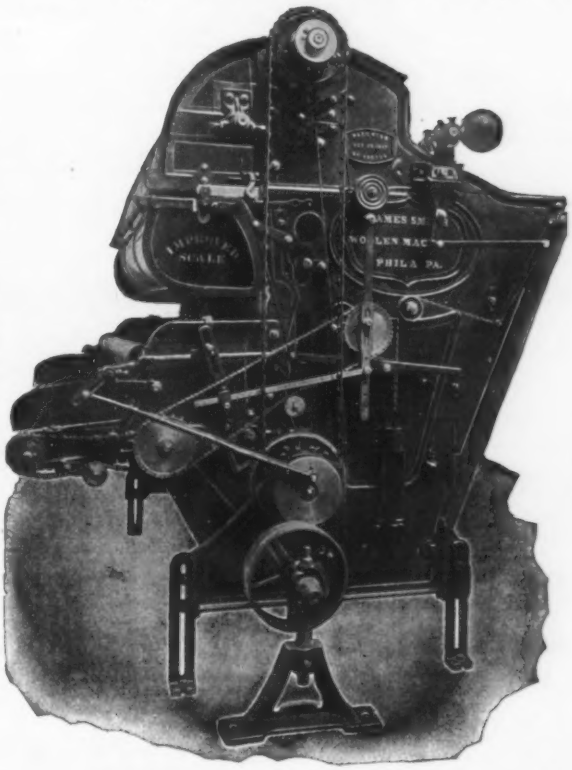

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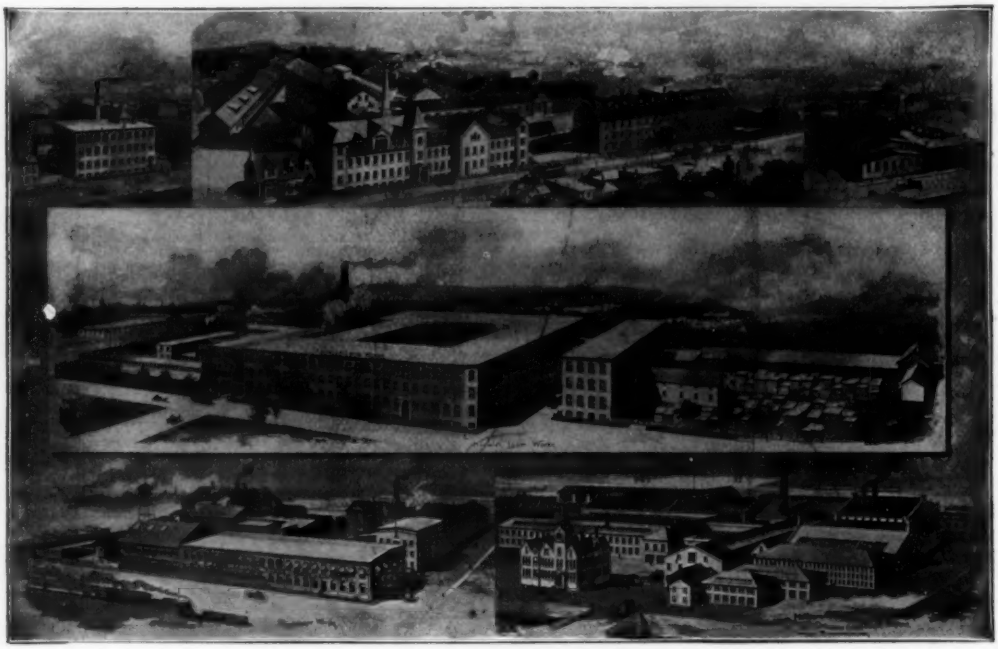

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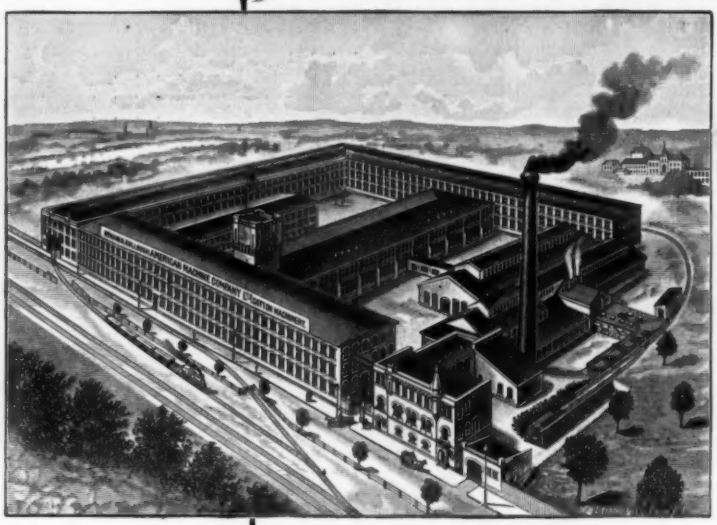

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VOL. 26. (NEW SERIES.) DECEMBER, 1903 No. 3.

Monthly Comment.

Wages in New England Cotton Mills.

The announcement of a reduction in wages in New England cotton mills during the past month was unwelcome, but by no means a surprise to any one at all conversant with the condition of the market for raw cotton and manufactured goods. The phenomenal advance in the price of raw cotton which began in January and continued without material interruption until the price of middling uplands at New York reached nearly 14 cents per pound in the latter part of July, was followed by a decline to 9 1/2 cents in October. Since that time a recovery has carried the price for the same grade of cotton to 11 1/4 cents, the price at the time the reduction in wages was announced.

There have been slight advances in the price of manufactured goods, but they have not been at all commensurate with the increased cost due to the rise in raw cotton. These have been the market conditions not only in this country, but in Great Britain and on the continent of Europe, and bitter complaints have been made by French and German manufacturers on account of their inability to secure higher prices for cotton yarn and cloth.

In view of these market conditions mill owners have been obliged to reduce wages or run their mills at a heavy loss. Since March 17, 1902, the wages in Fall River cotton mills have been higher than in any other place in the world, and in other New England mills the rate has been but very little lower. For many years cotton mill wages in Fall River were adjusted according to a sliding scale to conform more or less closely to what they called the margin of manufacturing. This margin was the difference between the selling price of 45 yards of regular 28-inch 64 by 64 print cloths and the cost of 8 pounds of Middling Uplands cotton. For example, in February, 1899, 45 yards of regular print cloths at 2 3/4 cents per yard amounted to $1.23 3/4 and at the same time 8 pounds of Middling Uplands at 6 1/2 cents per pound cost 52 cents. The difference between the two was 71 3/4 cents, which was called the margin. As the product of the Fall River mills became more diversified the method of figuring the margin was changed by substituting 22 1/2 yards of regular print cloths and 16.36 yards of 38 1/2-inch 64 by 64 print cloth for the 45 yards of the regular fabric above mentioned. Both methods were practically abandoned some years ago owing to the further increase in the variety of the goods made by the mills, which made it impossible to base wages on a margin calculated on print cloths alone.

It will, however, be interesting to trace the rise and fall of wages, cotton and print cloths and the resulting margins for a series of years. Since 1884 wages have been raised and lowered fourteen times in Fall River cotton mills. The following table gives the price of weaving per cut after each change of wages, also the price of cotton and cloth and the resulting margin, based on regular 28-inch goods:

	Weaving	Cotton	Cloth	Margin
Feb. 4, 1884	18.50	10 12/16	3 10/16	.77
Jan. 19, 1885	16.50	11 1/16	3 3/16	.55
March 1, 1886	18.15	8 15/16	3 3/16	.72
Feb. 13, 1888	19.00	10 10/16	4	.95
July 11, 1892	19.60	7 15/16	3 6/16	.94
Dec. 5, 1892	21.00	9 9/16	4 1/16	1.07
Sept. 11, 1893	18.00	7 3/16	2 12/16	.66
Aug. 30, 1894	16.00	6 15/16	2 10/16	.63
April 22, 1895	18.00	6 15/16	2 12/16	.68
Jan. 1, 1898	16.00	5 14/16	2 4/16	.54
Feb. 27, 1899	18.00	6 8/16	2 12/16	.71¾
Dec. 11, 1899	19.80	7 11/16	3 4/16	.84½
March 17, 1902	21.78	9 1/8	3	.59
Nov. 23, 1903	19.00	11 1/4	3 1/4	.56

It will be seen that the margin at the time of the last reduction, 56 cents, is practically as low as at any previous change of wages in the nineteen years. The wages since March, 1902, have been at the highest point. The reduction of 10 per cent. which has now taken place is on a basis of 19.8 cents per cut. Previous to 1892 this level was exceeded but once and then for a brief period in 1892, just before the second inauguration of President Cleveland. Under the influence of the tariff reform regime wages reached low water mark on a basis of 16 cents per cut in 1894 and 1898.

The recent reduction leaves wages in the New England cotton mills comparatively high, and the operatives have shown commendable wisdom and moderation in accepting the reduction without protest. It would be exceedingly gratifying to have conditions change so as to warrant a restoration of wages to the recent high level, but manufacturers as well as operatives are compelled to meet conditions as they exist. The cotton and cotton goods markets are governed by supply and demand which it is impossible for them to regulate or control.

Manufactured goods were first exported from England in the fourteenth century.

Another Metric Bill.

A bill providing for the compulsory use of the metric system in government work and looking to the eventual use of that system throughout the country, was introduced into the House by Congressman Shafroth on the first day of the present extra session.

In this connection attention is called to the general use of the English system of weights and measures in the German cotton industry, as evidenced by the valuable article in another part of this issue, The Size of Single and Ply Yarn, translated from a recent issue of the leading textile journal in Germany. In translating the German text into English, we found all the standards of weights and measures to be English. These remain in our English translation as they appeared in the German article, and are the standards by which the tests were made in the German mill. The inch by which the turns of twist are gauged, the yard by which the twist yarn and warp are measured, the pound on which the yarn counts are based and by which the yarn and warp are weighed, the yarn counts and hank, all are English, the same as are now in use in America.

The use of the metric system has been compulsory in Germany for nearly a third of a century.

Wool Growers and Manufacturers.

Representatives of the National Wool Growers' Association and of the National Association of Wool Manufacturers recently held a conference in Washington to discuss matters of mutual interest, among which was the proposed legislation providing for the labeling of textile fabrics to indicate the percentage of wool, shoddy, cotton and other fibres. A bill similar to the Grosvenor shoddy bill of last year was introduced at the recent extra session. The results of the Washington conference are to be reported back to the associations for action and it is to be hoped that an understanding will be reached that will make the differences of the past no longer possible.

Mill Bookkeeping.

The importance of a good system of bookkeeping is recognized by nearly all manufacturers. We know of one New England woolen manufacturer who depends on his bank account for information as to the state of his business. If his balance at the bank is large, his business is assumed to be prosperous; if it is small, he concludes he is losing money and prompt measures are taken to find the cause. This manufacturer is of the old school and has operated a small mill successfully for many years on this system of financiering. His case is the rare exception, the extreme of guess-work. From it to the other extreme where system in keeping accounts is developed to such an extent as to defeat the object for which it was devised, may be found all degrees of development in mill accounts.

There are few textile mills that do not have a fairly good system for what we will call their regular financial accounts, the records of debts and credits, included in journal, cashbook and ledger. These record the daily business transactions and, with the aid of an inventory, show the financial condition of the business at any time. These books are practically all that are required for the merchant, who sells merchandise in the form in which he buys it. Unfortunately many textile manufacturers assume that with a well-kept journal, cashbook and ledger, the manufacturer's accounts are in a satisfactory condition. This is a serious error and has been the cause of many business failures.

The manufacturer leases or owns a mill equipped with machinery and other necessary appliances, buys raw material, hires help to convert this material into a finished or partly finished product, expends money for supplies, taxes, insurance, etc. In return for this outlay he obtains a finished product which is to be sold by the yard or pound. Selling the finished goods at too low a price means a loss; fixing the selling price too high enables competitors with a better idea of cost to secure the orders and likewise means a loss. It is necessary to know the manufacturing cost in order to fix the selling price. To determine this cost the various items of expense such as raw material, labor, supplies, taxes, insurance, etc., must be apportioned among the different fabrics and the cost per yard for each item determined with the requisite degree of accuracy. This is a work of vital importance to every manufacturer. A good system of estimating cost is to the manufacturer what a headlight is to a ship at night. Without it the journal, cashbook and ledger will be but the records of a journey into the maelstrom of bankruptcy. With it the mill manager is able to keep the mill headed toward a profitable business.

In spite of the importance of estimating the cost of textile operations, it is a regrettable fact that a very large number of textile manufacturers depend upon rule-of-thumb methods or a very imperfect system for this work. Many fix their prices by those of their competitors. "If so-and-so can make goods for that price, I can," has been the rule and ruin of many a manufacturer. Owing to the greater uniformity in cotton manufacturing, this branch of the industry has been able to adopt a more satisfactory system of estimating cost than has been attained in the woolen and worsted branches, in which a much wider diversity in raw material, processes and fabrics exists. In a few of the larger and successful woolen and worsted mills very commendable attempts have been made to perfect a system of compiling mill statistics and estimating the cost of finished goods. The treasurer of one large worsted mill informed us that a system of compiling statistics of top, noil and waste from each lot of yarn had resulted in his saving $60,000 in one year in the cost of raw material. The same treasurer had his mill provided with a damp cellar in which the worsted yarn was stored and "conditioned." Statistics of the weight of the yarn going into and coming out of this room led him to boast that the cellar was the most profitable room in the mill.

The system for these special mill accounts is far from perfect even where it has reached its highest development. The manufacturers who have the best systems are prone to think them perfect owing to their great superiority over the methods of other mills. A subject of such far-reaching importance deserves the most careful and thorough investi-

gation. It is for the benefit of the whole textile trade that every individual manufacturer should be equipped with as perfect a system of estimating the cost of his goods as he now has for keeping the regular accounts of journal, cashbook and ledger.

Cotton and Cotton Goods.

The appearance on Nov. 30 of the government estimate of a cotton crop of 9,962,039 bales for this season was followed by an immediate rise in the price of middling uplands to 12 5/8 cents, at which it is quoted at this writing, a practical restoration to the high prices of last June and July, just before the new crop began to be received.

When the rise in cotton began last summer we called attention to the great advantage that such an increase in value would be to this country. We sell to foreign countries about 3,221,000,000 pounds of cotton per year, which is 60 per cent. of all we raise. At 8 cents per pound, the price prevailing a few years ago, the cotton exported is valued at $257,680,000. At today's price, 12 1/2 cents, it is equal to $402,625,000, a clear gain to this country of $144,945,000 per year, or $12,000,000 per month. Ordinarily that would be a cause for congratulation, but in many quarters the rise in cotton has been hailed as a national disaster, and predictions made as to the ruin of our cotton industry.

This calamity cry has been taken up by the writers in the daily press, and is echoed in every quarter, public and private. There is no question that the sudden increase in the cost of raw material is the cause of many serious difficulties to the textile manufacturer. The dealers in manufactured goods have for months stubbornly refused to buy at any advance, and this has left the cotton manufacturers to face 12 cent cotton and goods selling on a basis of 9 or 10 cents for the raw material. Such a situation is indeed serious and if there were no modifying conditions would afford ample justification for the gloomy forebodings that are now so prevalent.

Grant that there will be but ten million bales of cotton grown in the United States this year, and we then have within 5 per cent. if what was grown last year. Can calamity be calculated from such data by any arithmetical process? It is by no means uncommon for our supply of corn, wheat and other food products to vary as much as twenty per cent. from year to year without serious disturbance of the economic equilibrium. Why then should a reduction of five per cent. in the cotton crop ruin the textile industry? The difference between the process of preparing food products for the consumer and those necessary to convert textile fibres like cotton into garments ready for wear explains why a variation in the price of wheat, corn, oats, beef and pork and other food products causes less disturbance in business than does a change in the price of cotton.

The process of preparing grain, hogs, and cattle for consumption as food are comparatively short, simple and cheap, while the textile processes for converting fibres into garments are long, complicated and very expensive, requiring the services of a large number of mill operatives, wholesale dealers in raw material, yarn and cloth, clothing workers and retailers. Owing to these complicated processes the number of employes in textile manufacturing is larger than in any other industry in the country.

A change of values in such an industry naturally disturbs the currents of business by which the different branches are kept in profitable operation. The increased cost of raw material falls first on the mills, the leading branch of the textile industry. The millions of consumers demand goods at the old prices. The retailer, unable to sell at an advance, refuses to pay an advance to the wholesaler, who, in turn, presents the same refusal to the mill owner. The vast quantity of cloth and manufactured clothing always on hand enables wholesalers and retailers to supply the consumer at old prices for a considerable time after an advance in the cost of the raw material. This is the process that has been going on in the cotton trade for several months. Its duration depends upon the amount of goods on hand, but must end when that stock is exhausted. If continued long enough it may necessitate the shutting down of mills, but in any event the process is temporary and when the old goods have entered into con-

sumption, an advance in prices will restore an healthy balance between producer and consumer. The present process of readjustment may cause loss to many, including both manufacturers and employees, but it is temporary and cannot be construed into a serious menace to the textile industry.

As a matter of fact the cause of this disturbance in the cotton industry will surely bring untold wealth to the United States and that wealth will go to the many and not to the few. Foreign countries must have all the cotton we can spare and the money thus received will be distributed among the people of the South and stimulate the business of the whole country. It will aid 80,000,000 Americans to bear the increased cost for cotton cloth, resulting from the rise in cotton. It is, moreover, a serious mistake to assume that such an increase in the cost of cotton goods will be a serious burden to the consumer. A glance at the following table and the graphic chart at the head of our cotton market report shows from what a slough of despond our cotton industry has emerged since the dark days of 1894-1899, when cotton sold as low as 5 1/2 cents per pound. From 1880 to

AVERAGE PRICE PER POUND FOR MIDDLING COTTON.

Year.	Price.	Year.	Price.	Year.	Price.
1853	11.02	1870	23.98	1886	9.28
1854	10.97	1871	16.95	1887	10.21
1855	10.39	1872	22.19	1888	10.03
1856	10.30	1873	20.14	1889	10.65
1857	13.51	1874	17.95	1890	11.07
1858	12.23	1875	15.46	1891	8.60
1859	12.08	1876	12.98	1892	7.71
1860	11.00	1877	11.82	1893	8.56
1861	13.01	1878	11.22	1894	6.94
1862	31.29	1879	10.84	1895	7.44
1863	67.21	1880	11.51	1896	7.93
1864	101.50	1881	12.03	1897	7.00
1865	83.38	1882	11.56	1898	5.94
1866	43.20	1883	11.88	1899	6.88
1867	31.59	1884	10.88	1900	9.25
1868	24.85	1885	10.45	1901	8.50
1869	29.01			1902	8.75

1890, cotton averaged about 11 cents per pound, cotton goods were manufactured and sold at a profit, and the cost of cotton clothing was no burden on the consumer. The healthy balance between cost and selling price that prevailed in those years is being restored now.

High priced cotton is unquestionably a calamity to England and the Continent of Europe, where the cotton mills rely almost entirely upon the United States for their supply of raw material, but it can cause nothing more than a temporary disturbance of business in the United States. Much as we may regret that disturbance let us not lose sight of the fact that it is a passing phase of a process that will surely increase the general prosperity of the whole country.

Cotton in Peru.

The scarcity of American cotton has directed attention to every part of the world where it is possible to grow cotton with a view of increasing the production of this staple outside of the United States. It has led the Peruvian minister at London to address an urgent letter to his government, advising them to give English manufacturers as complete data as possible concerning the cotton growing industry in Peru and the possibility of increasing the Peruvian crop.

Reciprocity with Cuba.

In another part of this issue will be found a letter from a firm in Havana, Cuba, engaged in the import trade. After giving extracts from the new Cuban tariff and the proposed reciprocity treaty, they express some rather optimistic views upon the effect of this treaty on the import trade of Cuba in cotton goods. They state that a trade of from $6,000,000 to $10,000,000 in textile goods per year awaits only the ratification of this treaty to be diverted from Europe to the United States.

An examination of this tariff and the reduction made by the reciprocity treaty casts some doubt upon this question. Take, for example, plain cotton fabrics with not over 5.4 square yards per pound, and having 10 1/2 to 16 threads per 1/4 inch, counting both warp and filling. The Cuban tariff proposes a duty of 7 7/10 cents per pound on such fabrics. Assuming that the cloth measures 5.4 square yards per pound, this would be equal to 1 4/10 cents per square yard. The reciprocity treaty provides that goods of this character coming from the United States shall be

admitted at a reduction of 25 per cent., or about 1/3 of a cent per yard on the cloth above mentioned. This reduction made by the reciprocity treaty seems large when called 25 per cent., but reduced to the value per yard, is found to be insignificant.

It may be interesting to compare the Cuban rate with that imposed by the Dingley law on similar fabrics imported into the United States. The last named act imposes a duty of one cent per pound and an ad valorem duty of 25 per cent. if the value is over 7 cents per square yard of cloth measuring not over 6 square yards per pound and having 6 1/4 to 12 1/2 threads per 1/4 inch each way. This fabric is practically identical with that above cited from the Cuban tariff. The 25 per cent. ad valorem on 7 cents is equal to 1 3/4 cents. This added to the specific duty of one cent makes the total Dingley duty 2 3/4 cents per square yard, or nearly double the full Cuban rate. It is not likely that this small difference in our favor will be sufficient to drive European exporters from the Cuban market.

This fact will be more clearly recognized when we consider that in spite of the high duty imposed by the Dingley law there are still imported into the United States each year cotton goods to the value of more than $50,000,000. This is one-eighth of all the cotton goods consumed in this country. If the high Dingley rates do not prohibit the importation of cotton goods into this country, how can a reduction of 25 per cent. on the low Cuban cotton schedule result in giving us exclusive control of the Cuban market?

We do not call attention to this fact to discourage our exporters from any attempt to capture the Cuban cotton goods trade, but rather to bring our manufacturers to a realization of the actual conditions. It is only by realizing facts that we can hope to increase our foreign trade. The $6,000,000 of cotton goods imported into Cuba sounds large, but it should be borne in mind that a considerable portion of these goods consist of laces and other fine fabrics which we cannot hope to supply for many years to come. We are already purchasing similar goods in large quantities from Europe, and Cuba must look to Europe for such merchandise. With coarse goods the case is different, and our success in the China trade encourages the belief that by careful study of the Cuban market we may in time be able to build up a trade in the Cuban market. This trade, however, will not come to us by the ratification of a reciprocity treaty providing for a 25 per cent. reduction of the Cuban rates. We must first find out what the Cubans want and then deliver as good or better goods at the same or lower prices.

The Cotton Boll Weevil.

The United States produces over three-quarters of all the cotton grown in the world. The loss of that crop or of any considerable portion of it means much to the United States and still more to the rest of the world. With the exception of the dwellers in the arctics, who clothe themselves in furs, and the uncivilized hordes in the tropics who are not clothed at all, every inhabitant of the globe depends directly or indirectly upon the American cotton crop for clothing. There are substitutes for cotton, but they are scarce, expensive and inferior for the purpose to which cotton is admirably adapted.

No country outside of our Southern States has been found where cotton can be grown in sufficient quantity to supply the world's demand. Attempts are now being made by Great Britain, France and Germany to increase the yield of cotton in their colonies, but under such adverse conditions that it is doubtful if any material increase of the world's cotton supply will be obtained. The climate, the soil, the labor supply, the means of transportation, are all deficient. It seems chimerical to expect that the cotton from these new fields will provide for the natural increase in the demand. To count upon their supplying the demand now filled by American cotton is still further beyond the limits of possibility.

These conditions of the cotton supply and demand will convey without further explanation an idea of the extent of the calamity which the loss or serious impairment of the American cotton crop would be to the world. The civilization of the present time rests upon an adequate supply of cheap food and cotton

clothing. The first step in the civilization of the naked savage is to put on cotton clothing. Each succeeding step is accompanied by an increase in the use of cotton clothing. The supply of cotton and what we call civilization rise together. It is for this reason that the most serious danger that faces mankind today is the Mexican cotton boll weevil. After making allowance for the exaggeration of the reports of the damage, arising from the desire of cotton speculators to force prices up, there can be no question of the gravity of the situation. The American cotton supply is seriously threatened by this pest, which has thus far defied all attempts to extirpate it or limit its operations. It is slowly but surely spreading over Texas, and unless checked will eventually have the whole cotton belt within its grasp.

While this disaster threatens the world we find the people of this and other countries indifferent to or unconscious of the danger. Aside from some desultory action by the Department of Agriculture and the offering of a reward of $50,000 by the Texas Legislature for a remedy for the scourge, the Texas planters have been left alone to struggle with the pest as best they can. It is time that public sentiment was awakened to the extent and character of the danger. The annihilation of the little, sharp-nosed boll weevil in Texas is the most important problem of the present time. We can better afford to neglect all other issues than to shut our eyes to this one. The Panama canal, Cuban reciprocity, for which Congress was recently called in extra session, reciprocity with Canada, the Philippine question, the tariff issue, even the momentous question as to who is to occupy the White House for four years from March 4, 1905, are trifles light as air compared with the ravages of the cotton boll weevil. The problem is not merely American; it is world-wide, and one to whose solution the whole power of the government and the people should be applied at once.

Seasonable Fabrics.

MEN'S WEAR WOOLENS.

The condition of the market in men's wear woolens is dull, slow and apathetic, predictions were made that with the drop of the thermometer movement of heavy weights would immediately begin, these predictions have not been realized or only to a moderate extent. This partial stagnation may be due to the lateness of the season, or to the many strikes which have taken place in various sections of the country, with the necessary curtailment of the purchasing capacity of the masses of the people, both causes may be responsible for the apathy now prevailing.

Some of the selling agents complain that buyers exhibit a degree of timidity and cautiousness that is not warranted, but the fact remains that duplicate orders are not being received to the extent looked for; manufacturing clothiers show a disregard for any concession in price offered, and several lines of heavy weight goods are offered at material reductions. This is especially so in kerseys, meltons and heavy weight fabrics. Some of the agents maintain, however, that their initial business is satisfactory, and that the season is not sufficiently advanced to cause any discouragement, and that re-orders will yet come in due time.

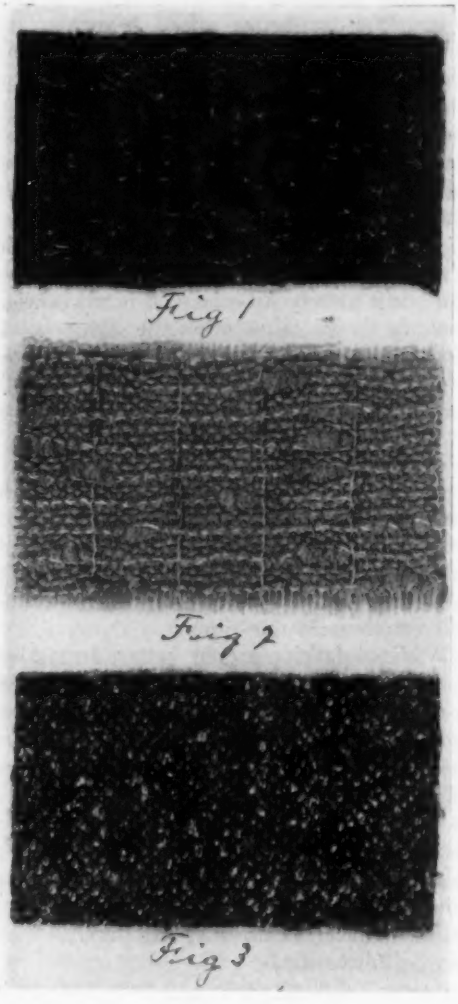
Worsted fabrics are in better demand in both trouserings and suitings. Overplaids and mixtures of various weaves with herring bone effects stand out prominently as being the best sellers this season. Ten, twelve and fourteen ounces hard twisted goods are still in considerable demand for rain coats, and have in a measure displaced the heavy weight overcoatings among popular favor. Deliveries on goods for current use are prompt, and few cancellations on spring purchases are coming forward.

DRESS GOODS.

Although it is generally conceded that the dress goods division of the market has enjoyed a better season so far than other divisions, it is evident that even in dress goods all things are not satisfactory.

The lines exhibited, both imported and do-

mestic, show a more comprehensive collection than any other season heretofore and the general quality of a better character. This is due to the demand by the consumer. It is marked to the satisfaction of all concerned that inferior low priced goods are not meeting with the same favor as they were a few years ago.



Sheer goods, such as voiles, etamines, twine cloths, albatross, wool crepes and goods of that family are the leaders for spring, 1904. Donegal and Scotch suitings have met with phenomenal success, so much so, that there is grave danger that the production will yet exceed the demand. The usefulness of this fabric covers a wide field, for all purposes of rough wear such as outing, walking or traveling it excels, both in separate skirts and two piece suits.

Zibelines for current use are sought for with every indication that they will remain in popular favor to the end of the present season. This fabric has been now in use for three consecutive seasons and it cannot be expected that it will continue to be in vogue much longer. The Botany Mills, however, are showing their faith in zibelines, as this is one of the most prominent among their spring lines. Fig. 1 illustrates a camels' hair zibeline shown by this mill; this is of the short sheared flaky white hair variety. Mr. J. Love, their New York selling agent, states that their spring business is perfectly satisfactory and that their western road men are sending in some substantial orders sufficient to keep their plant in full operation for months to come. Staple goods such as cheviots, granites and serges receive the usual support. Such materials are popular from year to year without any marked change either in weave or price, and no abatement is discernible in the demand.

Homespun and crashes will be much worn during the coming season; good orders have been placed both by the jobbers and cutters. Fancy weave fabrics like Fig. 2, which is a two tone twine cloth with nub yarn have gained strong support; this is sold by Joel & Schiffer (H. A. Caesar) and comes in a wide range of colorings. Wool grenadines in plain and fancy effects are receiving a good deal of attention. A. D. Juiliard reports good business of the productions of the Atlantic Mills. Their jacquard silk and wool eolines, nub broadcloth, nub voiles, albatrosses, are bought in substantial quantities. J. Lovell (H. A. Caesar) is showing a wide variety of Scotch suitings as shown in Figs. 3 and 4. These are light weight goods for spring and summer wear.

Mohair fabrics are receiving that degree of attention that warrants the prediction that their vogue will be broadened, and used in garments, heretofore deemed impossible. One of the latest is a mohair rain-proof fabric

produced by Holden, Leonard & Co., in their Oneko Mills. This cloth possesses a sheen and a lustrous effect that will compel favor and it compares well in point of quality with any brought out by the Bradford manufacturers, and it can be truly stated that the variety sent over this season is pre-eminently strong.

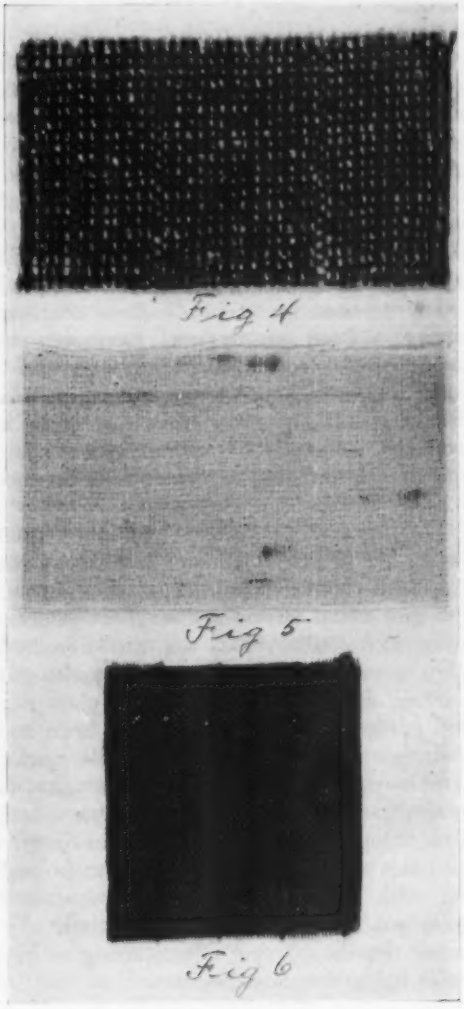


Fig 4

Fig 5

Fig 6

The Arlington Mills are also exhibiting a strong line of domestic mohairs, and their productions are being freely taken by the jobbers. Fancies have in a measure displaced the plain. Fig. 5 shows an illuminated white ground with nub blue irregular stripes, sold by Joel & Schiffer (H. A. Caesar). Clough, Pike & Co., Bradford, have met with marked success with their mohair zibeline. This is a popular price fabric, goods being sold to jobbers and cutters at 32 1/2c. Frederick Butterfield shows a wide range of metallic prints as well as a number of woven designs, as shown in Fig. 6.

The request for broadcloths and goods of the smooth and panne finish variety has been most noticeable during the past month. Costumes made of these materials are much worn in white, from pure white to deep cream, champagne, and pastel tints at afternoon and evening functions.

SILKS AND VELVETS.

Some slight improvement is shown in the silk market, although the conditions existing are by no means satisfactory, the depressing effect caused by closing out 30,000 pieces through the medium of the auction rooms not having disappeared. In a number of instances quotations are being revised and the price level is about 5 per cent. lower. Fancies are making some headway.

An attempt has been made to revive plaids and the blue and green combinations have sold fairly well. Printed warps have received some degree of attention, but the business put through has been limited. The success of both of these lines is a matter of doubt among the trade, and but slight confidence is placed in them. More confidence is being shown in small, neat unobtrusive designs, hair lines and seeded effects, but it cannot be said that these are by any means strong. Black broad silks, including taffeta, peau de soie, and staples, such as plain colored taffetas, are the main stay of the silk trade. Competition on these lines, however, is keen and the margin left for the manufacturer is small. Pelgram & Meyer are showing the largest line of plaids and printed warps, and Mr. Schiffer states the demand for such lines has been moderate. Fig. 7 shows the style of printed warp made by this firm.

The Brilliant Silk Mfg. Co., of Paterson (Abegg & Rusch), exhibit some beautiful designs of brocades, as show in Fig. 8. These are beautiful specimens of domestic manu-

facture, the quality is excellent and the shades exquisite. Silver grey, with a white and black floral design, blue or mauve grounds with rose designs, cannot fail to appeal to feminine fancy; it is very satisfactory to learn that this mill has more orders on hand than they can turn out for months to come at a time when more than one half of the looms of the country are idle.

William Strange & Co., report good business having been done on their "Punjab silk." This is a light filmy fabric very soft and lustrous and made up in a variety of gun metal shades.

Foulards promise to be as popular for spring and summer of 1904 as in any previous season. Cheney Bros., are showing some very beautiful monotone designs which merit high praise and are fully up to the high standard for which this concern is famous.

At Fig. 9 is shown a Jasper broche made by the Liberty Silk Mills (Schefer, Shram & Vogel). Fig. 10 illustrates a two tone double thread carpet weave made by the same mill.

The demand for crepe de chine continues strong. Peau de cygnes, Louisines and goods of the soft finished textures are in good request. Some crepe effects in heavy tissues possessing novel effects are being introduced. There is a continued call for Japs, and shantungs promise to be one of the most popular fabrics for spring wear.

The demand for velvets continues good, blacks are in active demand and stocks running low. Velvet costumes in black, browns and gun metal effects are much in evidence. Some extreme novelties are shown such as plain grounds, with a large jacquard contrasting designs, the request for plain navy and golden brown velveteens has been such that they are practically out of the market. Corduroys have been freely bought for misses' costumes and coats. Purple shades from the palest mignon to royal are in favor with the best trade. Chiffon velvet is meeting with favor for reception and evening dress gowns. Metallic prints continue to be in fair request. Jasper effects and gun metal greys being the most popular.

WHITE GOODS.

A feature of the present buying is the call for sheer goods, many lines of which have sold ahead, so that manufacturers have little to find fault with in respect to this particular

fabric. The position of jacquard damask sateens has not improved. Concession in price has not been able to move them in any considerable volume and the demand for them has fallen below the two previous seasons; a larger margin of profit was obtained on white goods of this character than any other comparatively low price cotton, with the result, that many mills turned their attention to this class of fabric that had been hitherto making ordinary bleached staples, production having exceeded the demand. The range of designs shown is very extensive and with the advance of the season, it is probable that a larger demand may arise than now exists. Fancy weave and ordinary piques, both fine and large cords, are in moderate request, with the demand for fleece-back goods entirely eliminated. Heavy mercerized vestings, which have been used for waist purposes are a failure and in many instances have been closed out at a loss, some stocks were disposed at 50c. on the dollar.

Plain mercerized basket and etamine weaves have been purchased to a limited extent. Jacquard repps and matellasses are not esteemed so highly as last spring. A very attractive novelty in matellasse weave for fall is a tinsel effect. The prediction was made that matellasse would prove strong for fall waists, but the vogue lasted only a short time and the demand has returned to albatross and flannel.

WASH GOODS AND PRINTS.

The collections of ginghams of the wash goods variety comprise an extensive variety. The Lorraine Mfg. Co. have some exquisite designs among their Tzattlee silks, with very beautiful colorings, which compare most favorably with imported lines.

Those made by the Clinton Mills, sold by Perkins Van Bergen, are remarkably good. An etamine canvas weave made by the Clinton Mill, is sold to jobbers at 12 1/2 cents. The same mill is making an overthread mercerized cheviot of the two tone variety at 12 1/2 cents. The Arnold print works present to the trade a fine printed oxford weave fabric, called the "oxford nonpareil," also a large variety of the various repp weaves. The suisse broderie fabrics made by the same mill, a leno effect, promises to have a large sale. The twine gauze from the Aberfoyle Mills, sold by Galey & Lord, deserves special mention. The Parkhill Mfg. Co. are showing a novelty of the chambray ground jacquard fancies, that will surely occupy a prominent place among washable goods of the coming season. The Gireen Mfg. Co. are showing an extensive line of highly mercerized plain and fancy weave voiles which are attracting considerable attention among buyers, in addition to the boucle effects called Kennimore suitings. The collection of the Merrimac Co. embraces a wide variety of woven madras and jacquard mercerized novelties.

C. L. Bausher & Co. report the sale of the entire output of A. F. C. ginghams within a very short period.

George Duren & Sons, agents for the Manvills Mills report very satisfactory business on Manchester chambrays, Bourette productions and embroidered Swiss dot mousseline de soie.

The Holts Mills are showing very large and attractive lines of ginghams, domets and Madras fabrics and many classes of goods of this character. There is little to remark in the demand for calicoes. Stocks are low and prices firm with a hardening tendency. Print cloths are in fair request with prices unchanged.

COTTON LININGS.

The situation has made but slight improvement. The condition is one of inactivity. Percalines and silesias, more particularly the lower grades, have moved in considerable volume, with a slight increase perceptible for the better grades. The cutters have placed during the month fairly substantial orders for Italians and mohairs.

Sisal hemp is a distinct product of Yucatan. When the Spaniards landed there in 1506 they found the Indians using hemp and twine made from the agave fibre. It takes its name from the old town of Sisal on the northwest side of the peninsula.

The Importance of Good Bookkeeping for Manufacturers.

BY THOMAS L. GREEN, VICE PREST., THE AUDIT COMPANY, NEW YORK.

(From American Industries.)

What manufacturer has not asked himself some such questions as follow: "Have I a good cost system of accounting? Are the statements of my affairs presented to me monthly made up on a conservative basis?" No doubt the general condition of the bookkeeping in the principal manufacturing establishments of the country is better than it used to be. Still, there is room for much improvement.

This is particularly true in manufactories which have been long established and where the present methods of accounting cannot be called modern, but are really pieces of patchwork, where bookkeeping methods of fifty years ago still hold their place, modified only where some modern necessity has compelled a modification—a case of new wine in old bottles, with the familiar result.

It is precisely these old-fashioned concerns which on the one hand repudiate any suggestions that they need professional advice and on the other hand may be the first into the hands of a quack practitioner with some panacea in the shape of a patent device which is stated to be a sure remedy for all bookkeeping ills that manufacturers are heir to.

So far as the matter of his costs is concerned, what the manufacturer needs is such a system as will enable his bookkeeping department to distribute his disbursements in such a way as to show the exact or, at any rate, the approximate cost of each article or group of articles which his works may turn out. Unless this is done, the concern must remain in ignorance of the very vital question whether it is making or losing money on each such article or group of articles. A knowledge of what he is doing, in detail, is one of the first requirements of the modern manufacturer. I venture to say that without good statistical knowledge no long continued success is now possible; nor can any special system be recommended offhand. A good cost system does not flash out of the sky like a meteor, but must be the result of a careful study of the circumstances in each particular case, so that accounting principles well known in themselves may be applied with judgment and with knowledge.

Then, too, the modern manufacturer must be sure that the statement of his affairs, as presented to him by his bookkeeping department month by month, is such as to afford a true insight into his real condition—must satisfy his banker as well as himself. It may be that no careful inventory, by count or measurement, is taken, with the result that accurate information in regard to the profits and condition of the concern must always be wanting. In other cases the inventory, while correct as to quantity, is taken into the accounts at selling value for the finished products.

Perhaps this state of things is due to the very fact that there is no cost system to show what prices should be put upon such products. For example, it is the custom of the textile manufacturers, and of other concerns who manufacture on orders ahead of the season to take up the finished goods at the prices at which they are contracted to be sold. Such contracts do, indeed, excuse that practice and in the long run such accounting regulates itself; but the profits for any particular year may by that method be seriously overstated or understated. Objections to such methods of inventorying will occur to everyone—such as the fact that a fire may destroy the supposed profits. With certain marked exceptions the practice of taking an inventory at anything above the cost prices is faulty in itself.

There is only one source from which profits may come and that is the sale of goods; and until such goods are actually sold and the obligation to pay is put upon the customer, there can be no real profit. Inventories are useful only as a method of adjusting the accounts so as to separate the actual profit of the period from that of other years.

French Worsted Spinning.

V.

BY A FRENCH TEXTILE ENGINEER.

(Copyright, 1903, by Lord & Nagle Co.)

FINE WOOL, NOS. 26 TO 64.

There is practically no difference in the methods of working fine and medium wools by the French system of worsted spinning. There are nine preparatory operations with fine wool and eight in working a medium grade. This increase is due to the use of two

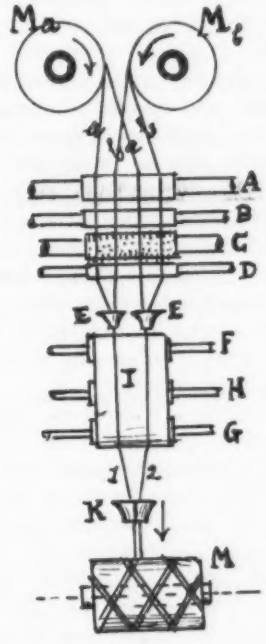


FIG. 19.

intermediates instead of one. The process is begun with a gill box, Fig. 13. This is followed by four draw boxes with rub aprons and then follow four bobbin frames. These bobbin frames are in reality ordinary porcupine frames, Fig. 16, with condensing aprons. The only difference is that the bobbin frame has but one lower roll, D, in place of the two rolls, D D°, which are found in the machine shown at Fig. 16. The finisher frame winds the roving in parallel style on the bobbins and these bobbins or spools are placed on the spinning frame. Each bobbin has but one strand of roving and these strands are not doubled, but are spun single with a draft of from eight to eighteen according to the size of the yarn desired. This method results in retaining in the yarn all the irregularities that existed in the roving. For this reason it is important that the roving be as uniform as possible.

Before leaving this subject we will say a few words on the importance of doubling on the preparatory machines. The doubling in French spinning differs from that of ordinary doubling as found in silk and cotton manufacturing and gives a much more uniform thread. A peculiarity in French worsted spinning consists in doubling the roving which is wound on one bobbin, Fig. 19. Each of the two supply spools, Ma and Mb, delivers two strands to the machine. For example, the two strands, aa, come from the spool Ma, while the two strands, bb, come from the spool, Mb. In this manner four strands of roving enter the rolls and after coming from the delivery or front rolls are reduced to two strands (1 and 2), which are condensed by the rubbing aprons and then wound side by side on the bobbin M.

The advantage of this method lies in the fact that the strand as it comes from the machine consists of two strands from two different supply spools. For example, the strand (1) is formed from one strand, a, from the spool Ma, and another strand, b, from the spool Mb. Owing to this arrangement the roving delivered to the machine is much more regular and free from twists and bunches than if it had been made in the ordinary way with a single or double strand. By the last named method the roving would be formed from two strands coming from the same spool; these two strands lying side by side have corresponding irregularities due to the defects in the rolls of the preceding machines which cause a lump or thin place in each strand at the same time and place. If they are united to form one strand these

defects will be reproduced in the resulting strands, whereas by the method illustrated at Fig. 19 the inequalities of each strand of roving are partially corrected by combining two strands made at different times.

SPINNING.

The roving from the finisher is next taken to the spinning machine. The strands are wound parallel on the bobbin as shown at Fig. 18, the yarn being wound in the shape of a cone at each end. They are placed in the frame of the spinning machine and the roving is drawn from them by the drawing rolls. Fine and medium yarn for dress goods and knit goods is usually spun on the mule. The ring frame is used for coarse counts made from long, coarse wool. The coarse fibres have a strong tendency to separate from each other during the spinning process and this is especially the case on the mule, owing to the great length of roving hanging loose between the rolls and spindle point during the processes of drawing and twisting on the mule. Moreover the production of the ring frame is much higher than that of the mule, chiefly because of the time lost while the carriage of the mule is passing in and out.

From every point of view the ring frame is superior to the mule for spinning long wool. Very fine wool to be used for knit goods for which a fluffy yarn is desired is always spun on the mule regardless of the size of the yarn. Frequently filling from medium wool is spun on the ring frame, but it must then be twisted rather hard and is therefore less fluffy than when spun on the mule. Up to the present it has been found impossible to spin as soft and bulky yarn on the ring frame as on the mule. This is because of the frequent breaking of soft yarn on the first-named machine, necessitating an increased amount of twist which causes the yarn to be smoother and more compact.

DRAFT IN SPINNING.

The roving is always drawn on the spinning machine, both mule and ring frame, without the use of the porcupine. The drawing apparatus consists of three or four pairs of corrugated rolls, the number depending upon whether the wool is short or long. They are similar in construction to those shown at Fig. 14. The drawing rolls D D′ consist of a corrugated roll, D, and a large roll, D′, covered with parchment. The large roll is pressed against the lower or fluted roll. The front rolls are run at a high speed to draw the roving finer. The speed of the other three pairs of rolls is much slower than that of the front drawing rolls, but is the same for each of the three.

The intermediate pairs of rolls, B and C, are not weighted and consequently they press the strands very lightly, the pressure being due entirely to the weight of the upper roll, the surface of which is smooth and not fluted. The delivery rolls, A, feed the roving to other rolls and are held together under great pressure by means of springs, in order that the strands may be firmly held while being drawn. The surface of the upper roll is smooth. The intermediate rolls, B and C, serve to hold the roving in place and prevent it breaking. Without these intermediate cylinders the strand would disintegrate because of the electricity caused by the drawing process, that is to say, by the friction of the fibres on each other.

The intermediate rolls serve another and very important purpose; they prevent the irregular drawing of the short fibres between the back rolls, A, and the front rolls, D. The front rolls, D, seize the fibres and deliver them with great rapidity. As the back rolls, A, run much slower it is evident that as long as the fibres are held by the back rolls, A, they cannot be drawn any faster than the surface speed of these rolls. The long fibres are thus held firmly by the delivery rolls, A, till just before the fibres are seized by the front rolls, D. This, however, is not the case with the short fibres in the roving. These short fibres are left to themselves during a considerable part of the journey from the back to the front roll; they are released by the rolls, A, long before being gripped by the front rolls, D. In this condition they are easily drawn forward by the long fibres which lie next them and have been seized by the front rolls. If it were not for the intermediate rolls the short fibres would be jerked forward rapidly in advance of the slower

moving fibres that are being fed by the back rolls, A.

As the long fibres which are being drawn rapidly forward by the rolls, D, constitute the greater part of the roving, the short fibres, which are held by neither front nor back rolls, would be rapidly drawn along with them in an irregular fashion, causing twits and bunches in the yarn. The intermediate rolls, B B′ and C C′, which are driven at the same speed as the feed rolls, A, prevent this irregular movement of the short fibres. As the pressure of these intermediate rolls on the roving is very light, they do not prevent the long fibres which have been gripped by the short rolls from passing rapidly forward. The corrugations on the surface of the lower intermediate rolls, B and C, are very fine; the upper rolls are smooth. The upper roll, C′, is made very light so as not to impede the drafting of the roving. Frequently a 1 3/4 ounce roll at C′, is too heavy and necessitates an extra pressure on the rolls, D D′, in order to draw the roving. The draft in spinning seldom exceeds 18; it varies from 12 to 18 for fine counts and from 8 to 12 for coarse counts.

TEMPERATURE AND HUMIDITY FOR SPINNING.

Yarn is always spun dry, that is, without passing the roving through a liquid during the spinning process. It is, however, necessary to have the air of the spinning room very damp and very warm. The temperature should be from 72° to 86° F., and the humidity should be at about the point of saturation, 90°. It will not answer to have the air of the spinning room very damp and not very warm. Air at a low temperature carries but a small amount of water, even at the point of saturation. On the other hand air at a high temperature carries a large amount of water at the point of saturation.

The object of moistening the air in spinning rooms is to make the air and wool better conductors of electricity. The electricity is developed by the friction of the fibres on each other during the drawing process. This electricity is the source of many difficulties and it is the constant endeavor of spinners to prevent it by keeping the air moist. Just as soon as the conductivity of the air is diminished by reason of the reduction of the humidity the yarn begins to grow twitty, irregular and fuzzy. This is because the fibres repel each other causing the roving to expand before it is seized by the front rolls. This expansion prevents the front rolls from gripping the fibres in regular order. As the roving expands the fibres are withdrawn from the nip of the front rolls and then when they do reach the front rolls an excessive number of them are gripped together. This causes the bunches and twits in the yarn. It is, therefore, absolutely necessary for good spinning that each cubic foot of air in the spinning room should carry a certain weight of water in the form of vapor. Experience has demonstrated that the amount of water required for this purpose is from 9 to 13 grains per cubic foot.

Various devices are used for humidifying the air in spinning rooms. Nearly all of them are based on the pulverizing of the water by means of an atomizer. This atomizer consists of a wheel constructed on the turbine principle and revolving very rapidly. They are placed near the ceiling of the room at intervals of about 60 feet. This apparatus is open to very grave objection, at least from a theoretical point of view. To humidify the air properly it is not enough simply to pulverize the water and mix it with the air in the form of very fine drops. This is merely a mixture of dry air with drops of liquid, in other words, a sort of artificial fog which has not the qualities of moist air.

To really humidify the air it is necessary not only to pulverize it, but to convert it into a vapor; this is a very different matter. Now to vaporize water it is necessary first of all to apply heat, that is, to apply to the water the latent heat of vaporization, which is about 500 calories per kilo of water. This amount of heat is necessary to cause water to pass from the liquid to the gaseous form and at the same time preserve its original temperature. For this reason the atomizer should be provided with a constant supply of heat in order to convert the drops of water into vapor.

The ordinary moistening device is defective in this respect. It is a fact that there are several types of moisteners by which the air

is converted into vapor and which supply to the spinning room the conditions of humidity and temperature necessary for producing the best results in spinning.

From what source does the water derive the heat necessary for vaporizing the water? Not from the air in any case because the air does not retain for any considerable length of time one-quarter of the heat necessary for vaporizing. It should not be forgotten that the various preparatory machines, particularly the spinning machines, develop an immense quantity of heat, and are in fact so many furnaces throwing out heat.

What becomes of the power that is constantly being consumed by worsted machinery, for example, the 15 H. P. which is necessary to drive a mule? We know that this energy is not destroyed, for science teaches us that no energy is ever lost. It can be transformed either into heat or electricity, and the latter in turn into heat. A worsted mule requires 15 H. P. This is equal to 160 calories per minute or 640 calories every four minutes. In other words, the heat developed by the worsted mule is capable of evaporating 11 pounds of water every 20 minutes. This shows that a worsted mule is a fairly energetic furnace. This heat would become unsupportable in a spinning room if it was not consumed in evaporating the drops of water that are blown into the air by the humidifier. It is because of this heat developed by the mules that spinning rooms are usually warm and the machines are never cold to the touch.

(To be continued)

Chinese Fabrics Made From Wild Silk.

By the courtesy of the Department of Commerce and Labor, at Washington, we are enabled to give our readers illustrations of native Chinese silk fabrics made from wild silk, also the results of the analyses we have made of these fabrics. The samples were forwarded to the Department by Henry B. Miller, United States Consul at Niuchwang, China. Under date of June 22, he wrote as follows regarding them:

There is exported from this port and from the Yalu River and other ports in Manchuria considerable quantities of raw white, yellow, and wild silk and some silk cloth, pongees, and cocoons.

It is not possible to give even an approximate estimate of the amount, because that from all the ports excepting Niuchwang is carried by the native junks and through the native customs, of which we have no records. Exports, however, amount to millions of taels per annum. Large quantities of cocoons go to Chefoo and Shanghai and are there made into yarns and cloth. Some of these cocoons and skin silk are sent from Shanghai to France and are made into a special ribbon embroidery for the Chinese trade and returned to China.

The silk district extends from Kyao-chau on the coast over the mountains into the interior at the head waters of the Yalu River.

The autumn cocoons are carefully kept by the natives over winter and the silkworm is hatched in April. These are taken into the hills where a scrubby white oak is grown and are put upon these trees to feed. About July another cocoon is formed and the worm from this finds an abundance of food in the full foliage. The last cocoons are therefore the most valuable. The process is much more crude than that used in the finer kinds of silk production, and the oak shrub does not produce as tender a food as the carefully trained and cultivated mulberry.

The oak is planted upon the hillsides and mountains, where the ground is too rough and steep and poor for food cultivation. At 3 years old the tree furnishes food for the worms. The process of removing the silk from the cocoon, as well as that of making the cloth, is all hand method and the labor involved is enormous.

Kyao-chau is the centre of the cloth-making district. I enclose samples and present prices of Kyao-chau cloth. Sample No. 1 is made from the raw silk, while the others have had the fibre dressed and softened by boiling before weaving.

We have analyzed these fabrics with the following results:

No. 1.

Native Chinese silk cloth.
17 1/4 inches wide, 50 feet long.
Price, $5.50 to $6.00 per piece.
Weight, 2.6 ounces per yard 17 1/4 inches wide.
Warp, 68 threads per inch.
Filling, 50 threads per inch.

Average size of yarn in cloth 20 6/10 drams.

No. 2.

Native Chinese silk cloth.
18 1/2 inches wide, 52 feet long.
Price, $7.50 to $8.00 per piece.
Weight, 1.8 ounces per yard 18 1/2 inches wide.
Warp, 72 threads per inch.
Filling, 66 threads per inch.
Average size of yarn in cloth 11 1/2 drams.

No. 3.

Native Chinese silk cloth.
19 inches wide, 52 feet long.
Price, $6.00 to $7.00 per piece.
Weight, 1.5 ounces per yard 19 inches wide.
Warp, 78 threads per inch.
Filling, 68 threads per inch.
Average size of yarn in cloth 8.74 drams.

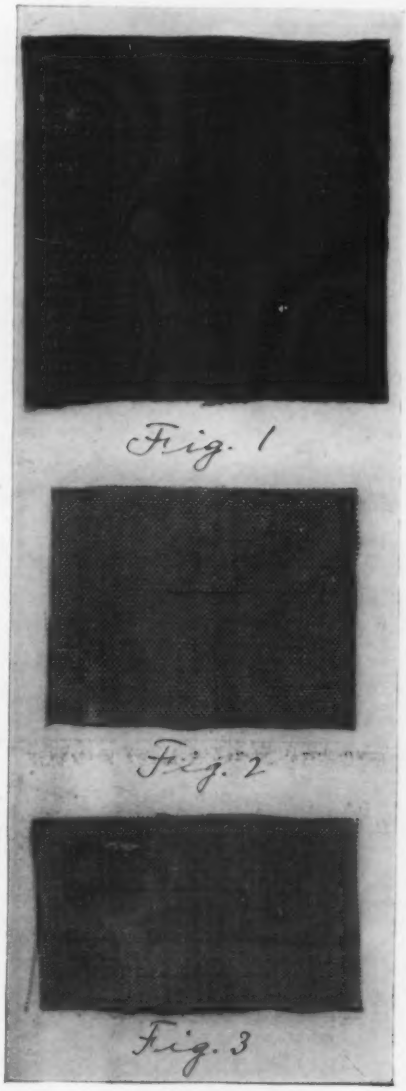
No. 4.

Native Chinese silk cloth.
19 1/2 inches wide, 50 feet long.
Price, $7.50 to $8.00 per piece.
Weight, 1.6 ounces per yard 19 1/2 inches wide.
Warp, 74 threads per inch.
Filling, 54 threads per inch.
Average size of yarn in cloth 10 1/2 drams.

It will be noticed that we have given the size of the silk yarn. This is as the yarn is found in the cloth, and allowance must be made for take-up in all of the samples and for the loss in boiling off in samples Nos. 2 and 3. As this allowance can be better left to the judgment of individual manufacturers, we give the size as the yarn lies in the finished goods.

A practical silk manufacturer who has examined the goods says the fabrics do not seem to have had much of the gum boiled out of them, as is generally done before dyeing, although the dyeing process would loosen and probably disgorge more or less of this gum. The colors are very fugitive. This is seen by rubbing the samples with a piece of wet cotton cloth, when the color crocks badly. By not boiling off the weight of the fabrics is kept not far from its original figure. These rough fabrics made from wild Asiatic silk have been very fashionable for a season or two past, and promise to be much in favor during the coming season.

In our September issue we published a description of a number of cotton fabrics which were selling freely in the Chinese market and had been sent to the Department by Consul Miller. In sending samples of goods, with particulars of their price and manufacture, he shows his appreciation of what information



American manufacturers need regarding foreign markets, and it is to be hoped that his example will be followed by others in the consular service.

Worsted yarn takes its name from a town in Norfolk where it was first spun in the fifteenth century.

A Glimpse of the Textile Mills at Amiens.

Amiens, France, Nov. 18, 1903.

The textile industry of Amiens dates from the earliest times. At the time of the conquest of Gaul, 51 B. C., this industry was in a flourishing condition at Amiens. By the eighteenth century the production consisted almost wholly of woolen goods, at present the production is classified as follows:

1. Plush for upholstery purposes.
2. Cotton velvet.
3. Linen goods.
4. Woolens.

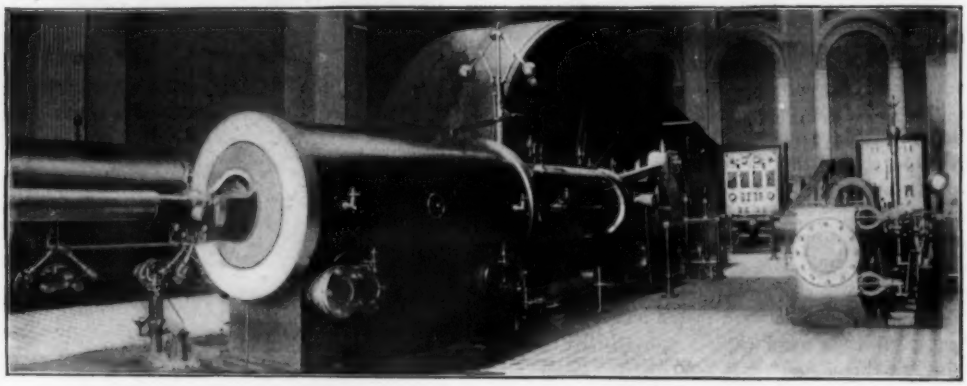


FIG. 1. ENGINE ROOM IN COSSERAT MILL.

The velvets included in the first class comprise all those used in upholstery, velours d' Utrecht, de Genes, de France, de Boheme, etc., and are manufactured by hand in the

FIG. 2. LINEN WEAVE ROOM IN COSSERAT MILL.

neighboring villages, only one firm, H. Parison & Co., with 150 looms, making these goods on power machinery. M. Louchet Bernaux operates 130 looms on single and double velvets of this class and also manufactures a small quantity of moquette carpets.

The bulk of the production of the Amiens mills consist of cotton velvets, which are manufactured by the following firms: Cosserat, 500 looms; Cocquel, 600 looms; Carruelle, 50 looms; Sutcliffe, 80 looms; Hagimont, 600 looms; Hubault, 150 looms; Dequien, 200 looms.

This makes a total of 1,280 looms exclusive

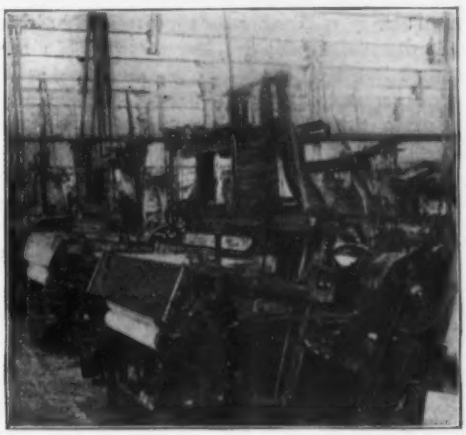


FIG. 3. COSSERAT AUTOMATIC LOOMS.

of those in the valley of the Somme and the suburbs of the city. A single mill, that of Messrs. Esnault-Pelterie, operates 1,200 looms on cotton linings and print cloths. There are two linen mills, Cosserat with 450 looms, and Societe Liniere with 400 looms. The jute mills are: Bloch, 100 looms; Saint, 50 looms; Lheureux, 20 looms.

M. Gamounet runs 120 looms on woolen satins. The Bulot and Saguez mills make braids and ribbons. Altogether there are 5,000 power looms in Amiens.

All the mill buildings in this region have but one story. Fig. 1 is a view of an engine room in the mill of Cosserat. The engine is of the Corliss type with two cylinders, developing 1,200 H. P. In addition to this 100 H. P. is obtained from water power.

This mill makes both woolen cloth and cotton velvets. Fig. 2 shows the linen weave room, at one end of which will be seen an altar erected to the Holy Virgin, M. Cosserat being a very practical Catholic.

FIG. 4. ESNAULT-PELTERIE MILL TENEMENTS.

Fig. 3 shows a row of Cosserat automatic looms. The shuttles are changed automatically; the looms are 34 inches wide and run

FIG. 5. A HAND VELVET CUTTER.

185 picks per minute, the same as the regular plain looms. Fig. 4 is a view of the mill tenements connected with the Esnault-Pelterie mills.

Although cotton velvets are cut by power in the mills of Cosserat, Cocquel, Descat, Sutcliffe, Guenin, etc., there are still many hand cutters at work in their own homes. The dean of this profession is shown at Fig. 5. He is eighty-five years old, has been a velvet cutter since 1834, and is still working at his trade.

The velvets woven at Amiens are colored and finished at the same place. There are fifteen dyeing and finishing establishments, but with the exception of two or three all of them are old and in poor condition. A large part of the product of the Amiens mills is purchased by the manufacturing clothiers of Amiens, of whom there are twenty-five manufacturing garments for the working people.

JAMES TORRANCE.

THE CUBAN MARKET FOR COTTON GOODS.

Havana, Cuba, Nov. 2, 1903.

Editor Textile World Record:

As a market for cotton goods Cuba presents unusual attractions to the American manufacturer. The importations of manufactures of cotton into Cuba in 1902 were slightly in excess of $6,000,000, something over 90 per cent. of these goods coming from Europe. If the proposed reciprocity treaty is approved by the American Congress, the consumption of cotton goods in Cuba should easily increase within a few years to $10,000,000, and the market be practically at the disposition of the American manufacturers. The advantage which American goods will enjoy will be seen from a careful perusal of the existing tariffs on imports applied to cotton goods, and the schedule of reductions in favor of the United States.

The following is an extract from the Cuban customs tariff:

Cotton yarn and thread for crocheting, embroidering, sewing, etc., including the weight of reels, 33 cents per kilo (15 cents per lb.)

114. Cotton tissues, plain and without figures, napped or not, weighing 10 kilograms or more per 100 square meters (5.4 sq. yds. or less per lb.), unbleached, bleached or dyed, having

a. Up to 9 threads per 6 mm. (9 1/2 threads per 1/4 in.), 15 cents per kilo (6.8 cents per lb.)

b. From 10 to 15 threads per 6 mm. (10 1/2 to 16 threads per 1/4 in.), 17 cents per kilo (7.7 cents per lb.)

c. From 16 to 19 threads per 6 mm. (17 to 20 threads per 1/4 in.), 23 cents per kilo (10.4 cents per lb.)

d. 20 threads or more per 6 mm. (21 threads per 1/4 in.), 35 cents per kilo (15.9 cents per lb.)

The same tissues printed or manufactured with dyed yarns, dutiable as tissue, with a surtax of 30 per cent.

115. Cotton tissues plain and without figures, napped or not, weighing less than 10 kilograms per 100 square meters (5.4 sq. yds. or more per lb.), unbleached, bleached or dyed, having

a. Up to 6 threads per 6 mm. (6 1/2 threads per 1/4 in.), 15 cents per kilo (6.8 cents per lb.)

b. From 7 to 11 threads per 6 mm. (7 1/2 to 11 1/2 threads per 1/4 in.), 20 cents per kilo (9.1 cents per lb.)

c. From 12 to 15 threads per 6 mm. (12 1/2 to 16 threads per 1/4 in.), 27 cents per kilo (12.2 cents per lb.)

d. From 16 to 19 threads per 6 mm. (17 to 20 threads per 1/4 in.), 37 cents per kilo (16.8 cents per lb.)

e. 20 threads or more per 6 mm. (21 threads per 1/4 in.), 50 cents per kilo (22.7 cents per lb.)

The same tissues, printed or manufactured with dyed yarns, dutiable as tissue, with a surtax of 40 per cent. net weight.

116. Cotton tissues, twilled or figured on the loom, weighing 10 kilograms or more per 100 square meters (5.4 sq. yds. or less per lb.), unbleached, bleached, or dyed, having

a. Up to 6 threads per 6 mm. (6 1/2 threads per 1/4 in.), 15 cents per kilo (6.8 cents per lb.)

b. From 7 to 11 threads per 6 mm. (7 1/2 to 11 1/2 threads per 1/4 in.), 18 cents per kilo (8.2 cents per lb.)

c. From 12 to 15 threads per 6 mm. (12 1/2 to 16 threads per 1/4 in.), 20 cents per kilo (9.1 cents per lb.)

d. From 16 to 19 threads per 6 mm. (17 to 20 threads per 1/4 in.), 32 cents per kilo (14.5 cents per lb.)

e. 20 threads or more per 6 mm. (21 threads per 1/4 in.), 42 cents per kilo (19 cents per lb.)

The same tissues printed or manufactured with dyed yarns, dutiable as tissue, with a surtax of 30 per cent. net weight.

Cotton tissues twilled or figured on the loom, napped or not, weighing less than 10 kilograms per 100 square meters (5.4 sq. yds or less per lb.), unbleached, bleached, or dyed, having

a. Up to 6 threads per 6 mm. (6 1/2 threads per 1/4 in.), 18 cents per kilo (8.2 cents per lb.)

b. From 7 to 11 threads per 6 mm. (7 1/2 to 11 1/2 threads per 1/4 in.), 23 cents per kilo (10.4 cents per lb.)

c. From 12 to 15 threads per 6 mm. (12 1/2 to 16 threads per 1/4 in.), 32 cents per kilo (14.5 cents per lb.)

d. From 16 to 19 threads per 6 mm. (17 to 20 threads per 1/4 in.), 43 cents per kilo (19.5 cents per lb.)

e. 20 threads or more per 6 mm. (21 threads per 1/4 in.), 55 cents per kilo (25 cents per lb.)

The same tissues printed or manufactured with dyed yarns dutiable as tissue with a surtax of 40 per cent. net weight.

Piques of all kinds, net weight per kilogram 45 cents (20.4 cents per lb.)

Cotton knitted goods. Underwear of simple finish or rough sewing, net weight, 70 cents per kilogram (31.8 cents per lb.)

The same of double sewing or fine finish, 80 cents per kilo (36.3 cents per lb.)

The following is condensed from the proposed Reciprocity Treaty:

"The following articles, as enumerated and described in the existing customs tariff of the Republic of Cuba, being the product of the soil or industry of the United States, imported into Cuba, shall be admitted at the following respective reductions of the rates of duty thereon as now provided in the customs tariff of the Republic of Cuba.

"To be admitted at a reduction of 25%: Cotton and manufactures thereof now classified under paragraphs 114 and 116.

"To be admitted at a reduction of 30%: Cotton and manufactures thereof, except those now classified under paragraphs 114 and 116, and except knitted goods.

"To be admitted at a reduction of 40%: Manufactures of cotton knitted, and all manufactures of cotton not included in the preceding schedules."

Hosiery, gloves, etc., of simple finish or rough sewing, 70 cents per kilo (31.8 cents per lb.)

The same of double sewing or fine finish, net weight, 90 cents per kilo (40.8 cents per lb.)

By the number of threads in a tissue, shall be meant one-half of all the threads comprised in the warp and weft in a square of 6 millimeters (.236 in.). Should this half contain a fraction, the fraction shall be counted as an entire thread.

A kilo being about 2 1/5 pounds, it will be readily seen that stockings weighing 2 1/5 pounds to the dozen can, under the terms of this treaty, be imported into Cuba from the United States 36c. per dozen less than from other countries, so far as the customs tariffs are concerned. The advantages the American manufacturers of cotton goods will enjoy are in almost the same proportion throughout the list.

In brief, here is a market at the very doors of the United States, ready to send yearly to American manufacturers orders for cotton goods amounting to $6,000,000 to $10,000,000 and only awaiting the opportunity to divert this trade from Europe to the United States.

The importing dry goods dealers of Cuba are strong and wealthy concerns, the larger of whom buy on cash or short time basis. The consumption covers an extensive variety, everything from 2.85 brown drills to the finest lawns and organdies. In fine dress goods the demand runs to very light weights, both on account of the climate and because of the heavy import duty. This is also the case with hosiery. Very little knitted underwear, such as is manufactured in the United States, is used.

If the pending treaty is passed, we shall contribute through these columns such information concerning the cotton goods business in Cuba as may be of interest to American manufacturers. Meanwhile we would be pleased to answer any inquiries from manufacturers desiring to cater to the importing jobbers of this island.

Frank G. Robins & Co.

OLIVE OIL AND ITS TESTS.

BY BETA NAPHTHOL.

Olive oil is one of the most important oils used in the textile industry, the chief reason being its very easy solubility in soap solutions, and also for the reason that it leaves the stock without any appreciable odor. It is also much used as a "mixer" for other oils that do not scour out as readily, being thus used to aid the scouring process. Other uses for it are quite numerous, one of the better known being its conversion into alizarine assistant, alone or in combination with castor oil. It is also employed in the manufacture of many varieties of cotton softeners and soft soaps. It would be difficult to find any branch of textile manufac-

turing where olive oil in one form or another is not used.

Olive oil is exported in very large quantities from the Mediterranean countries, and is produced in several grades, the finest, or table oils, being obtained by simple draining from the olives; the next grade is obtained by the aid of pressure in the cold; the third grade is obtained also by pressure, but with the aid of heat, and the last or "foots," by the aid of solvents. As a matter of fact, different countries have different processes for extracting the oil, and the outline above given is not to be regarded as holding good for all oil producing districts.

Owing to the great demand for the several grades of olive oil, and its consequent high price, there has always been a tendency to lower its cost to the consumer by the admixture of certain other and cheaper oils that would in no way alter the good qualities of the olive oil, and the best known of all such oil is that from the cotton seed, and it is the object of the purchaser of olive oil to be sure that what he pays for is the real article and not a sophisticated one.

To make a test of olive oil for an adulterant is not by any means an easy matter, but the following notes may serve to point out differences, if any exist, between a sample of olive oil known to be pure, and a suspected sample of the same grade, for very great differences may exist between two samples of the same oil, but of different grades.

SPECIFIC GRAVITY.

This is one of the most important tests for all oils, as the specific gravity (density) of all commercial oils are pretty well fixed. It is determined by several methods, the most common being with a hydrometer (instrument like a Twaddle glass), but graduated for liquids lighter than water, that is less than 1. The "glass" is simply allowed to sink in a sample of the oil, and the gravity is read off from the stem. The following table gives the gravities for common oils:

Olive oil	0.914 to 0.917
Peanut oil	0.916 to 0.920
Almond oil	0.914 to 0.920
Cotton seed oil ...	0.922 to 0.930

COLOR TESTS

are used to indicate admixtures with olive oil, and for this purpose nitric and sulphuric acids are used. The tests may be made in test-tubes (obtained from any druggist or supply house for a few cents apiece). A small quantity of the suspected oil is placed in a test-tube and a few drops of concentrated nitric acid poured on top, when the color is observed after gentle shaking.

Olive oil, colorless, yellowish, or greenish.

Peanut oil, reddish.

Almond oil, colorless, or slightly greenish.

Cotton seed oil, brown or brownish-red.

The above are for pure oils. Mixtures in different proportions will yield intermediate shades.

TEST WITH STRONG SULPHURIC ACID.

Many chemists prefer this test to any other, but it is well to use each test, and not depend on the results of one—rather form an opinion based upon two or more different tests.

To 20 drops of the oil, add 2 drops of sulphuric acid, and observe the color before and after stirring.

	BEFORE.	AFTER.
Olive Oil	Yellow, green or pale brown.	Light brown or olive green.
Peanut Oil	Grey yellow to orange.	Greenish to red dish brown.
Almond Oil	Colorless to yellow.	Dark yellow, olive or brown.
Cotton-seed Oil.	Very bright red to reddish brown.	Dark reddish brown to nearly black.

There are quite a number of other tests to be used, but they require special chemicals and apparatus that need not be mentioned here, but Bechi's test, on account of its specific application to olive oil that is adulterated with cotton seed oil may be safely given.

The reagent used is made by dissolving one gram (15 1/2 grains) of silver nitrate in 200 ccs. (7 ounces) of 95 per cent. alcohol. Any druggist can make this solution. A mixture is also made of 85 parts of amyl alcohol and 15 parts rape seed oil. The test is made by taking 1 cubic centimetre of the silver nitrate solution, and 10 ccs. of the rape seed oil solution above, and 10 ccs. of the sample to be tested, and heating for 15 to 20 minutes with constant stirring, when, if

cotton-seed oil is present, a deposit of metallic silver will be noticed.

It should be remarked that this test, like all others, should be made several times for practice, and upon samples of known purity and admixture. Every buyer and user of olive oil, where no chemist is employed, should know how to make it.

THE ADJUSTMENT OF COTTON PREPARING AND SPINNING MACHINERY.

EBEN C. WILLEY, BOSTON, MASS.

(Read before the New England Cotton Manufacturers' Association.)

(Continued from November.)

INTERMEDIATE FRAME.

The intermediate roving frame is a duplicate of the slubbing frame, excepting it has the addition of a creel for receiving the bobbins of roving from the preceding machine and which are doubled two into one, and drawn down by the rolls to a finer strand, twisted and wound on to bobbins for the next process.

The size of frames is smaller in proportion to hank roving required, but the same care and attention should be given the rolls, twist and tension as suggested for the slubber, and the draft should be comparatively short; the rolls on this frame handle the cotton in less bulk, but at the same time in drawing the sliver they have the twist to overcome; hard twisted roving cannot be drawn evenly, and very often rolls are spread farther apart to overcome excessive twist in slubber roving, which the length of staple does not warrant, with the result, that uneven roving is made, extra twist is put in and more trouble caused for the next process.

Vibration in the back and middle rolls should be carefully guarded against, and the causes are dry roll stands and frame being out of line or level. Wooden saddles should be replaced by iron wherever used, as they retard the free turning of the top rolls, particularly when they get worn.

FLY FRAME.

The fly frame is the last process in the carding room, unless the fourth or jack frame is used to double and draw the roving finer, in order to reduce the draft to a minimum on the spinning frame or mule for fine yarns.

The fly frame is a copy of the intermediate, excepting in the arrangement of the rolls and size of its different parts, which are much smaller; the rolls have two ends to a boss or four to the roll.

The same general rules apply to the care of these as in the preceding frames, although the rolls require special attention, owing to the extra ends and fineness of roving. Much imperfect work is caused by a short traverse on this frame, for unless the holes in roving guide are close enough to allow a long traverse without running out at ends, and to over-lap each other in the centre of boss, it will leave a high place in the middle and a hollow roll will be the result, consequently there will be much uneven roving made, as the slivers cannot be held firmly by top roll. Very few traverse motions run quickly enough and nearly all allow more or less dwell at the ends. Traverse motions should be governed by the lifting rail, instead of by the back roll and by a better arrangement more readily adjusted, another strong point would be that as lay shortened on the bobbin the length of traverse would change correspondingly. This is only a suggestion, however. Long or short draft affects the speed of traverse by the present method, and as draft of fly frames varies from 6 to 7 1/2, it can readily be seen how the different drafts alter the time to traverse each way.

Extreme care should be taken to have rolls very true and evenly matched for front, and the bosses of the back rolls should be even in size.

Sheep skin makes a good covering for all back rolls and calf skin for front rolls, a roll covered with the latter can be buffed true without injury to the leather.

Vibration of the back rolls should be avoided and they should be inspected often, as this is a serious fault, and one which is more likely to occur on this frame, owing to the slower speed of back rolls and the greater number of ends to be drawn.

Very few mills are entirely free from this trouble, and it is the cause of many broken threads on the spinning and uneven and weak places in the yarn.

The tension should be carefully regulated, although a tight tension on this process does not injure the roving as on the slubber or intermediate, owing to its lighter weight and extra twist, but is more liable to break and cause a piecing.

If an end on a frame breaks by fault of tension being too tight, it breaks at presser, if tension is too slack, it will fly out of flyer on all processes of roving frames.

SPINNING FRAME.

It is not necessary in the spinning of an even thread to refer to spindles, bands and setting of spindles or rings except possibly in a general way: it is understood, however, that good, even, strong yarn can not be produced unless the roving has been prepared for it in the card room with that end in view, and if this has been accomplished, the result will be product and quality which will show its effect in the succeeding operations through which the yarn passes to the woven cloth. And on the strength of the warp yarn particularly, depends to a great extent the success of the mill, and the variation in strength and quality of yarn is more noticeable in those mills which manufacture sheetings or cloths that require strength in the warp, to withstand the strain on the yarn in the looms.

Coarse yarns up to and including No. 26 can be spun from single roving, and it will be strong enough owing to the size of the thread but finer yarns must be stronger in proportion and the only method is by spinning the yarn from double roving, not with an extreme draft, however, although the double roving will allow for a longer draft, which would not be possible with a single roving.

Double roving usually gives 10 per cent. stronger yarn, and a smoother and evener thread.

There are various opinions as to the advantage between the short and long boss roll; on medium and fine numbers, the advantage seems to be on the side of the latter roll for several reasons, to wit: less saddles to be kept in place and levers adjusted; less oiling, consequently less liability for oil to get on the yarn; less cleaning by half as many rolls and ends to keep clean and free from waste, and if spinning fine yarns, less trouble will be experienced if weight is taken off middle rolls, for owing to the long roll being heavier, it does not retard the delivery of roving to front roll, and it is not necessary to spread the rolls for the long staple as with frames equipped with short boss rolls: this is a decided advantage.

The solid front top roll seems to be preferred by many and for medium or fine work is preferable. Rolls should be evenly covered with light lamb skin, and cot should not be drawn on too tight, and prevent the cushion action on steel roll owing to their small diameter.

If front top rolls are shell, they should be carefully matched in pairs before putting on an arbor by testing in a gauge for the purpose; solid rolls ought to be tested also for variation in size; a good roll coverer will have no trouble in matching his cots, if he gives the matter careful attention. Short boss rolls do not require the care in covering that is necessary in the long roll.

Spindles, rings and thread guides must be set and adjusted properly to get the best results, and as it is the small matters which make up the whole in spinning, the little details should receive careful attention in order to get the product per spindle which determines the ability of the successful spinner, and spindles should be run at their highest speed, commensurate with good work and their greatest efficiency.

SPOOLING.

The spooling frame is one of the simplest and most easily operated machines in a cotton mill and winds the yarn from the warp bobbins on to the spool, and in doing this, special care should be taken that bobbin holders are set the proper angle so as to get the least possible strain on the yarn, also that holders are the correct size to receive the bobbins of same, and that holder wires are not too heavy for the numbers of yarn being spooled. The thread guides should be set close enough to prevent a bunch or loose waste passing through same on to spool; a too quick traverse is also an objection, and a happy medium between the half and full spool is desirable in order to get a hard, firm and even spool of yarn; the quick traverse crosses

over the threads instead of laying them parallel to each other, and by the unwinding of yarn from spool at the warper creel on the slow traverse, there will be noticed less snap and pull, as yarn reverses on each wind.

It would be an advantage, if spooling frames were arranged so that the speed of traverse could be as easily changed as on a spinning frame.

While the spooling operation has always been a simple matter, its effect has always been serious, owing to the necessity of a knot on the emptying of the warp bobbin, and several being necessary to fill spool, although the increased size of ring and traverse on the spinning has allowed a correspondingly greater amount of yarn to be wound on to bobbins and has lessened the knots which have always been a handicap to getting the best results on the weaving, the disadvantage, however, is in the irregular tying of knots by the operatives, as no two would tie exactly the same, and it is not possible for any person to break the threads the same length in tying the many hundreds each day, particularly as the spooler tender is always paid by the amount turned off, and they are very apt to let a poorly tied knot go, hoping that it will pass without being noticed at the warper, and if it gets to loom, a bad knot always breaks and causes more or less trouble.

The knotter placed on the market several years ago seems to have filled a long-felt want, as it ties the knots automatically, and cuts the threads so that all knots are uniform in length, and it is almost impossible to find a poor knot from the spooling, if machines are given attention and kept in good condition. The result of this is an increased production in weaving with less imperfections in cloth, which cannot be avoided by the old method of hand tied knots.

WARPING.

The warping of yarn from spools to section beam is not a hard problem, although it requires a fair amount of skill in the operative to prepare the yarn for the slashers in the best manner. If the yarn is strong and spooling has been done properly, everything will run smoothly at the warper, but if it is otherwise, a low product will result, with the usual difficulty in slashing with tie backs, spare threads and extra knots for the weaver to overcome in the warp.

Moderate speed is desirable in a warper owing to the number of threads usually wound on to a beam, and the necessity for a quick stop for a broken thread, also a quick action of the drop wire mechanism for stopping machine must be realized, and it is very essential that same be carefully looked after so that they will drop easily and quickly, and it will prevent many lost threads which cannot be picked up after drum has made several revolutions.

Smooth section beams with yarn wound on evenly, and the belt kept on the tight pulley from warp to warp, assures good work at the slasher which is necessary, as the stopping and starting of a slasher in the middle of a warp caused by poor warping, does not improve its weaving qualities.

SLASHING.

To the sizing of the warp threads depends the success in the final process of manufacturing, for without the proper coating of size on the yarn, no matter what its strength in the single thread, it could not withstand the chafing of the harnesses and reed, and the higher the counts more care must be exercised in its preparation for the loom. It is not necessary to go into details as to the merits of the various compounds used in size, with either corn or potato starch for the foundation.

Every one is fully aware that all size must be thoroughly cooked, and of the right consistency for the style of cloth and number of yarn to be dressed, and to a great extent the details are left in the hands of the slasher tender.

The temperature of the size should be kept uniform to get the best results, and the only way is to have the prepared size that enters size-box from kettle, of even temperature, with result that less steam will be needed to keep size in condition required, and it will not vary by excess amount of water entering same.

The best method to accomplish this seems to be the arrangement of the return pipe in connection with feed, forced to and back by

the rotary pump system, this keeps up a circulation of the size, and if not drawn off into size box is returned to kettle, it also keeps the size thoroughly mixed and of even quality.

Which is the best, exhaust or live steam for drying the yarn?

Exhaust steam may be used successfully on light sley goods, but it is doubtful if it could be used on what is termed sheetings, and have the yarn dried sufficiently. Slashers should be situated as near to the boilers as possible in order to reduce the condensation to a minimum, whether for kettle, size box or cylinders.

There is no set rule governing the product of a slasher, as the conditions are never the same under which they are run, but great care should be taken not to unnecessarily stretch the yarn while wet, for undue strain on the yarn in dressing, eliminates the natural stretch in the threads which is requisite for good weaving.

Extreme care should also be taken to have cylinders properly trapped, for while water in a cylinder prevents its drying the yarn, it also is a serious objection owing to its extra weight which adds to the strain on same.

FILLING.

Whether the filling is spun on frame or mule the thread should be as even and strong in proportion to its number and twist as the warp, for to the evenness and quality of the filling if loom is adjusted properly, largely depends the appearance of the cloth. To accomplish this it is necessary that the same stock be used as in the warp, and not separate the poorer grade of cottons for the filling, for in doing this the above yarn would necessarily be of an inferior quality which would show its effect in the appearance of the finished fabric. An extreme draft is not desirable in the spinning of filling yarns either on a frame or mule, although yarn from the latter machines is usually spun from coarser roving than would be possible on a filling frame, and it would seem preferable to spin same from roving with a medium draft, or, from double roving, and particularly so for fine sheetings, cambrics and other styles of cloth, that require finer filling than the warp and which have a higher count or pick, than sley.

As good filling spinning is absolutely necessary in order to get the maximum product from the looms, which is always desired, and as the above determines this matter to some extent, extra care should be taken to get this result, for the increased cost of a fine, hank roving if this is accomplished, is a small matter if an improved quality of filling is secured, and a high standard should be maintained, as poor filling is as serious a drawback to success in the weaving as poor warp yarn, and is the cause of fully as much trouble in this department of a mill.

Smooth, even filling yarn gives character to any fabric, at the same time improving its finishing qualities, and increases their value owing to the better appearance of the finished goods.

BLEACH HOUSE TOPICS.

WOOLEN GOODS.

BY PALMETTO.

The bleaching of woolen goods by the sulphur process either in a liquid sulphurous acid bath, or by the stoving method, is still very largely in use at the present day. To what good reason it owes its prominent place and popularity is very difficult to determine, as it is generally admitted as having but few desirable properties to commend it to the bleacher. On the contrary, it is an indisputable fact that the white thus obtained is not permanent, as but a short exposure to the atmosphere tends to restore the natural color of the wool, and to this extent it can not be regarded as properly bleached, but only partially so. The odor of sulphur which is so tenaciously retained by the wool even after repeated washings is very objectionable. Still another bad feature is that in practice it is very difficult and well nigh impossible to get uniform results in succeeding batches.

There is, however, one feature in connection with the use of this bleaching agent, which tends to keep it in use, and enable it to hold its prominent place in the face of other agencies of undisputed superiority, and

that is its low cost, which is considerably less than in the case of bleaching with peroxides of hydrogen and sodium, which in our opinion are the only other agents of sufficient importance to threaten seriously to displace sulphur in the bleach house. That this will eventually take place, possibly in the near future, we have not the least doubt, as the peroxide bleach has many desirable features to commend it.

The bleaching of cotton and wool mixed goods has always been attended with many difficulties not easy to overcome, and the results have seldom been as satisfactory as could be desired, for the very obvious reason that the sulphurous acid formed, or used in the process, damages the cotton to a very considerable extent, and the use of any concentrated alkali would have the same disastrous effect on the wool.

The peroxide process offers a medium by which this class of goods may be bleached to perfection, without any of the danger of tender goods, incident to the sulphur process. As to the relative cost between the use of peroxide of hydrogen, and peroxide of sodium, we believe the facts all point to the latter as being the most convenient, and economical, therefore this chemical will be the one on which our future remarks are based.

In actual practice of bleaching by this process, as in all others, it is very necessary to pay close attention to many details which one is apt to consider as being of only minor importance, yet, if not strictly adhered to, are very liable to result in failure and disappointment.

For the benefit of the bleacher who would become familiar with this process, we will endeavor to point out a few of the possible sources of trouble that he may have to contend with. We cannot too strongly emphasize the necessity of thoroughly cleansing the goods, previous to entering the bleaching solution, as on the thoroughness of this operation will depend very largely the final results, and the bleaching solution will be preserved for a longer time, thereby lessening the cost to that extent.

In making up the bleaching bath to the required volume and strength, great care must be exercised to ensure the bath being as free from iron as possible, as the presence of this metal, even in very small quantity, may be the cause of much trouble; to this end we would advise that lead steam coil be used instead of iron, and wooden pins be substituted for iron nails, also that drawing off a little water from the supply pipe before filling up the bath, and suspending a cheese cloth strainer, will prevent many impurities from entering the bath.

The bleaching bath, for union (cotton and wool) goods, or all wool material, is made up as follows: Calculate the amount of water necessary to cover liberally 200 lbs. of goods, which would be about 400 gals., making due allowance for the amount of water retained by the goods from the scouring operations. To this amount of water (cold) is added 21 lbs. of sulphuric acid (standard strength) 66Be; then add slowly while stirring 15 3/4 lbs. of peroxide of sodium, thoroughly agitate the bath and test with litmus paper. If the bath is found to be neutral, enter the goods and proceed with bleaching if the goods are all wool, but if unions, it would be advisable to add sufficient ammonia to make the bath very slightly alkaline, in which case red litmus paper will turn faintly blue. After goods are entered, turn on steam and raise the temperature slowly during one hour to 120°, then shut off steam for one hour, after which time raise temperature to 170°; continue at that temperature for three hours more, after which time the goods will show a satisfactory degree of whiteness. The goods are then passed through squeeze rollers and the liquor preserved, after which the goods are soured in a bath of one pint of sulphuric acid to each 200 gals. of water, then rinsed with sufficient water to remove all the acid. This completes the bleaching, and if the goods are to be used in light colors, the dyeing may be proceeded with. but if they are intended for white, it will be necessary to tint or blue them, according to requirements in the usual manner with indigo, aniline blues or violet.

Before the book of Genesis was written the Egyptians were skilled in spinning and weaving flax, as their palaces and tombs bear carved representations of its culture and manufacture.

TEXTILE PROCESSES.

EDITED BY E. A. POSSELT.

THE CONSTRUCTION OF BEDFORD CORD WEAVES.

Bedford cords are what we might technically term — rib fabrics, the face of the structure being produced by the warp, the filling resting (more or less floating) on the back of the structure, in order to produce the characteristic rib or cord effect (as running in the direction of the warp) to the fabric.

The arrangement of the "floating pick" can be done either with:—
2 picks face to alternate with 2 picks "float," or
1 pick face to alternate with 1 pick "float," or
2 picks face to alternate with 1 pick "float"; as a rule the first-mentioned combination being the one used, hence more or less adopted in the present series of weaves accompanying our article.

For interlacing the face of the structure — as a rule — the "plain" weave is used, producing in connection with the present system of weaves the most satisfactory result to the fabric. However, in some instances when dealing with high warp textured fabrics the $^{2}_{1}$ 3 harness or $^{2}_{2}$ 4 harness or $^{3}_{1}$ 4 harness twills may be substituted.

Bedford cords originally were introduced in the manufacture of worsted dress goods. However, since the past ten years have extensively found their way into cotton fabrics, and where they will remain — in plain and fancy effects — as we might say forever, producing pleasing effects to a certain grade of white cotton dres goods impossible to be duplicated by any othe weave, having in that line of goods completely supplanted the piqué weaves, in fact having already taken the latter name in the trade expression. Piqué weaves are produced by means of an extra (binder) warp — floating for a certain number of picks on the back of the structure and in turn interlacing for one pick in the face structure, thus producing the characteristic rib line effect running in this instance widthways, i.e., in the direction of the filling, in the fabric.

CONSTRUCTION OF BEDFORD CORD WEAVES.

A. Plain effects 2 : 2.

Diagram Fig. 1 shows a portion (24 × 12) of point paper covered with common plain weave.

Diagram Fig. 2 shows the same affair as given in Fig. 1 transformed by means of eight risers (see ⊠ type) into a Bedford cord weave. Repeat of weave 12 × 4. Examining diagram Fig. 2 more particularly we find that the additional risers to the plain weave (⊠ type) transformed every two alternate picks in each series of six warp threads into floating picks (all the warp up, the filling on back of structure), the same arrangement being exactly reversed in the adjoining series of six warp threads. Consequently when the filling interlaces in the structure in one series of six warp threads, said pick floats on the back in the adjoining series and vice versa. It is this floating of the filling arranged in the fabric in a straight line — warp ways — that gives to the fabric the characteristic cord effect, so much desired. In the same manner as producing cord effects of six warp threads ($^{5}_{1}$ and $_{1}^{5}$) by means of adding two risers (see ⊠ type) to the plain weave for every floating pick — this arrangement can be extended to 3, 4 or more risers for each floating pick, in this manner increasing, correspondingly, the size of the cords.

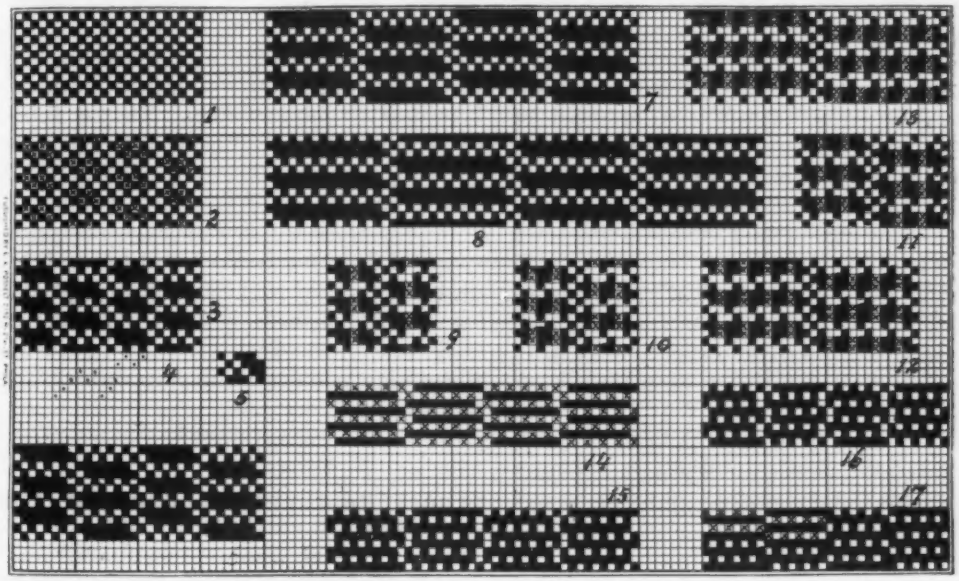
Fig. 3 shows diagram Fig. 2 executed in one color, being given, since in this way the character of the weave is better brought out. The same, as mentioned before, repeats on 12 warp threads and 4 picks; but can, by means of fancy draw Fig. 4, be drafted on 6 harness (a feature — 6 harness required — characteristic to every Bedford cord weave thus designed). Fig. 5 is the harness chain required for producing weave Fig. 3 by means of draft Fig. 4.

Diagram Fig. 6 shows a slightly larger Bedford cord weave than the preceding one given, repeating on 16 × 4, using eight warp threads for each cord effect. Three additional risers have in this instance been added to each respective portion of the plain pick to transform the latter in the proper position, to a floating pick. Size of floats in each cord $\frac{7}{1}$ and $\frac{1}{7}$ respectively.

Having thus shown the construction of the Bedford cord weave for 6 and 8 warp threads respectively, the next size of a cord would be

TO MAKE THE CORD EFFECT MORE PROMINENT

we frequently add one or more stuffer warp threads to each cord, arranging each stuffer warp to rest between the face structure and the floating picks, in turn giving the cord a more raised effect. The affair is readily explained by means of the accompanying illustrations Figs. 9 to 13, and of which Fig. 9 by means of ■ type shows the common 12 harness Bedford cord weave as shown originally by means of weave Fig. 3. The stuffer warp threads in weave Fig. 9 are shown by means of ⊠ type



for 10 warp threads, a weave omitted in the present instance in our collection of Bedford cords, since its construction will be readily understood from the explanations thus far given, as well as matter on the subject following.

Fig. 7 shows the twelve thread, cord, Bedford weave, repeating on 24 × 4 and

Fig. 8 the sixteen thread, cord, Bedford weave, repeating on 32 × 4. The construction of either weave, as well as any different size cord weave, will be readily understood from explanations previously given; all we care to mention being, that either weave can be executed on six (6) harness by means of a draft closely resembling the one given in diagram Fig. 4. In order

see warp threads 4 and 11), said warp thread interlacing:—

for 2 picks up = floating picks, to alternate with 2 picks down = face picks.

Repeat of weave 14 × 4.

When using only one stuffer warp thread for each cord as thus shown, in many instances we may have to use a heavier count of yarn for said stuffer warp as compared to the regular, i.e., face warp of fabric, a feature which, provided the difference in counts of yarn is too prominent, might result in having to use 2 warp beams, one for each kind of yarn, since radical difference in counts of yarn cannot be run from one beam, neither would they beam well nor weave well from one beam. To overcome the diffi-

culty it will then be advisable to use 2, 3 or more threads of the regular warp as one thread for each stuffer warp thread. Such an arrangement permits one beam work and is the one generally adopted.

Fig. 10 shows by means of ■ type the same Bedford cord weave as shown in the previously given weave, only that in the present example we use two stuffer warp threads for each cord (see ⊠ type in warp threads 3, 6, 11 and 14).

Repeat of weave 16 × 4. In this instance threads from the regular warp may be all that is required to act as sufficiently heavy stuffer warp threads, although double ends will certainly impart a more raised effect to the cord.

Weave Fig. 11 shows the common 16 harness Bedford cord weave (see Fig. 6) arranged for a stuffer warp effect. Repeat of weave 20 × 4. The stuffer warp threads, two (single or double ends) to each cord, are shown again by ⊠ type, vice versa the regular warp threads as are shown by ■ type.

Weave Fig. 12, repeat 28 × 4; four stuffer warp threads are in this instance used for each cord, whereas in connection with weave Fig. 13 (repeat 34 × 4) five stuffer warp threads are used for each cord.

Proceeding in the manner as thus explained, the reader will find no difficulty in adding a stuffer warp to any Bedford cord weave he ever may come into contact with.

B. Plain effects 1 : 1.

As mentioned at the beginning of the article this arrangement of face and floating picks is now and then made use of in the construction of Bedford cord weaves, for which reason a short description of their construction will be in its proper place here.

Weave Fig. 14 shows the construction :—

■ type = floating pick

⊠ type = face pick — plain weave.

The cutting line in connection with this construction of Bedford cords is done by means of interlacing the two cutting threads as separating the cords (see warp threads 1, 10, 11 and 20) $^{2}_{1}$. This will result in a less prominent cut effect as compared to that in the previously given weaves and where the cutting was done thus $^{1}_{1}$.

Fig. 15 shows the weave thus explained, executed in one kind of type. Repeat 20 × 4.

Weave Fig. 16 shows a similar Bedford cord weave, only a smaller cord effect, repeating on 16 × 4. The floating pick in this instance is—over 7 compared to the—over 9 in the previously given example.

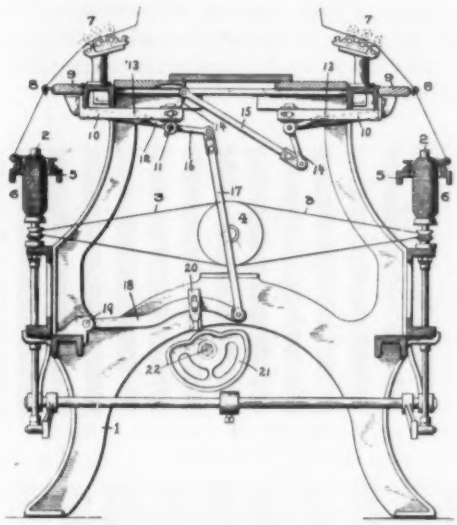
Another style of construction in Bedford cord weaves is shown by means of weave Fig. 17. Repeat of weave 16 × 4. The principle of construction is readily shown by means of the two kinds of type as used in the left hand upper corner. This method of constructing Bedford cords is identical with the method of designing employed in connection with worsted coating, fancy trouserings, etc., i.e., weaves technically known as rib fabric weaves. The cut line in connection with weave Fig. 17 is $^{3}_{1}$ and consequently (on account of the overlapping of the two cutting threads) not as prominent as either one of the two previously given methods, hence this system of designing Bedford cord weaves is less used in connection with cotton dress goods than the other two methods, however finds extensive use in connection with worsted dress goods and where a less prominent cut-off is desired to be shown.

(To be continued.)

STRAIN RELIEVING MECHANISM FOR YARN ON SPINNING FRAMES.

This mechanism may be used either for spinning or twisting frames, the object being to relieve the yarn from the strain which is caused by the short distance between the ring-traveler and the guide-wire on the thread-board when the ring-rail is at the highest point of the wind. The shortness of this distance causes the yarn to make a sharp angle where it passes through the guide-wire to the ring-traveler, this angle being increased when a large ring is used. Ballooning of the yarn is also lessened when the ring-rail is near the bottom of the wind. The strain on the yarn is relieved by having the thread-board made movable upwardly and an arrangement for automatically lifting it at the proper time, that is, when the rail is upward. The position of the parts of the mechanism

and their connections to each other are best seen by referring to the accompanying illustration, which is a sectional end elevation of a ring-spinning frame, embodying the mechanism. In the illustration, the figures refer to the parts as follows: 1, indicates the framing of the machine which supports on each



side the vertical spindles, 2, driven by bands, 3, from the driving-drum, 4. The ring-rails, 5, are vertically movable to feed the thread to the bobbins, 6. The thread is brought through the rolls, 7, supported on top of the frame, 1, and is led through a thread guide, 8, on the thread-board, 9, attached to the frame, 1, above the bobbins. Attached to the under side of thread-board, 9, is a lever, 10, which extends under the stand. A bell crank lever is centered at 11, and has one end, 12, carrying a pin, 13, which rests on the top side of the lever, 10. A rod runs through the centre, 11, on each side of the frame and thus gives all the levers the same movement, so that the thread-board moves the same along its entire length. The bell crank levers on each side of the frame are turned upside down from each other and the ends, 14, are connected by a rod, 15. Attached to the rod as running through the centre, 11, is a short lever, 16, which is jointed to the vertical rod, 17, the other end of which connects to the lever, 18, centered at, 19, and carrying the wiper, 20. This wiper rests on the cam, 21, which gets its revolution through the shaft, 22, and receives an upward and downward movement. As the ring rail goes up, the wiper is moved up, and through the levers described, the thread board, 9, is raised and by carrying the thread guide, 8, upward also, the strain on the thread is lessened. The levers are made adjustable as shown, in order to correctly set them.

PLAIN AND FANCY GINGHAMS.

Ginghams are fabrics so varied in their construction that it is almost impossible to declare with precision what class of weaves are used in their construction, and exactly to declare when the fabric so constructed reaches beyond the limit, so that it can be classed under the general term "Gingham." They are designed, as is well known, in various colors; one of their characteristics being the effect obtained through the combination of different tints. The yarn used in their construction is dyed in the colors desired before the fabric is woven. This separates them from the class of cotton goods on which the color is printed or stamped after weaving, such as calico, prints, etc.

No one class of weaves can be distinguished as those used exclusively in their manufacture, some weaves may be employed more than others. Nearly all of the weaves used in making different kinds of cotton goods may be adopted for ginghams. As will be seen later on, the weave to be used in each particular case is determined by the effect desired. This of course makes it possible to design a variety of novelties in these goods, and it is the constant aim of the designer to get up a new style.

THE PLAIN GINGHAMS

may be made in either stripes or checks. The weave used is the common plain weave.

In stripe effects the filling consists of one color, and must be of a color that will harmonize with all the tints of the warp with which it must interweave. White is very often used because it tends to soften the effect and to make the colors blend with each other. It will not destroy the effect of any color.

In making checks the task is more diffi-

cult. The filling then consists of two or more colors. They must be selected with great care, for each color in the filling must interweave with the warp, and therefore each color in the filling must be in harmony with the colors of the warp. The study of color harmony is very important indeed, because it is a well known fact that there are certain colors which when combined offend the eye, and others through the combination of which a pleasing effect is produced. It can easily be seen how very important it is to obtain a knowledge of good coloring. This can only be acquired by a long and careful study of the principles involved.

In order to explain the subject more in detail, a few practical examples of fabrics, in

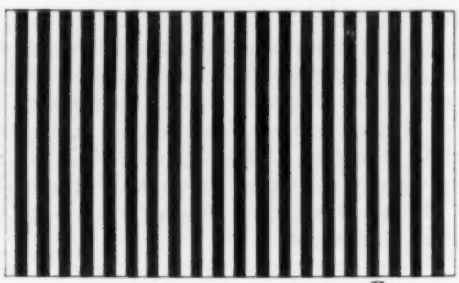


Fig. 1

stripes and checks, are given:

Fig. 1 shows a neat stripe effect produced on a texture of 64 warp threads per inch—finished fabric—16 stripes (8 repeats of pattern) per one inch.

Dressed: 4 ends light
4 ends dark
—
8 ends in repeat of pattern.

A corresponding effect, only in a better grade of cloth, can be produced by means of

Dressing: 6 ends light
6 ends dark
—
12 ends in repeat of pattern, using in connection with it a texture of 96 warp threads.

Fig. 2 shows a somewhat larger stripe effect, having 21 stripes (10 1/2 repeats of pattern) in 2 inches. If to be produced on a texture of 42 warp threads per inch — finished fabric —

Dress: 4 ends light
4 ends dark
—
8 ends in repeat of pattern.
Using: 6 ends light
6 ends dark
—

12 ends in repeat of pattern, and this with a texture of 64 ward threads per inch will produce a similar stripe effect, only in a better fabric.

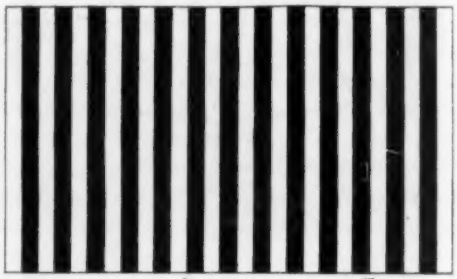


Fig. 2

Using a still higher texture, i.e., dealing with a still better make of fabric, say using a texture of 84 warp threads per inch and

Dressing: 8 ends light
8 ends dark
—

16 ends in repeat of pattern, will in turn produce the same effect in the fabric as shown in Fig. 2.

Figures 1 and 2 have shown balanced effects, i. e., effects in which the amount of the two colors used in the warp are balanced.

Fig. 3 shows an effect in which the two

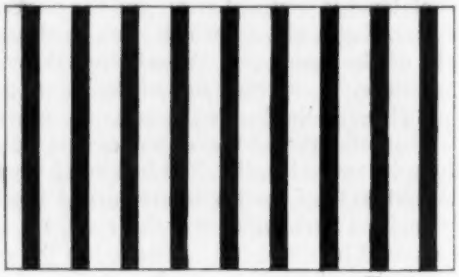


Fig. 3

colors used are not balanced, i. e., the light color predominating in the effect. Seven patterns in two inches.

In connection with a texture of 42 warp

threads per inch, we will have to dress the warp:

4 ends dark
8 ends light
—
12 ends in repeat of pattern.

In connection with a better texture, say 64 warp threads per inch, and wanting to produce the same size stripe effect, we will have to dress the warp:

6 ends dark
12 ends light
—
18 ends in repeat of pattern.

If referring to a still better fabric, for example a warp texture of 84 threads per inch, we have to dress the warp, in order to produce the effect in the fabric as shown in Fig. 3, thus:

8 ends dark
16 ends light
—
24 ends in repeat of pattern.

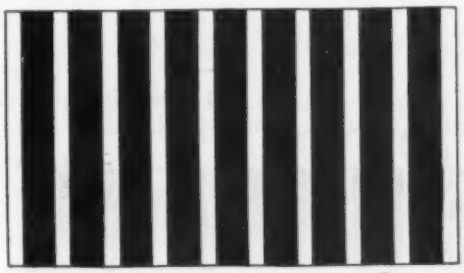


Fig. 4

Fig. 4 shows the reverse effect to the one shown in Fig. 3, i. e., a light stripe upon a dark background. Using the same textures as we have done in connection with style Fig. 3, and substituting light in place of dark, and vice versa, dark in place of light, in the dressing of the warp will readily explain how to proceed to produce the effect shown in Fig. 4 in the fabric.

Until now we have shown only simple stripe effects, i. e., one kind of light and one kind of dark stripe effect to produce the pattern in the fabric.

The next step towards figuring will be to combine different size of stripe effects (light and dark) in one repeat of pattern.

Fig. 4 shows such an example, two repeats of pattern in 2 1/4 inches, producing by means of a warp texture of 42 ends with the following dressing:

8 ends dark
4 ends light
8 ends dark
8 ends light
4 ends dark
4 ends light
4 ends dark
8 ends light
—
48 ends in repeat of pattern.

The same effect in the fabric, in connection with a better texture, say for example, 64 warp threads per inch, will require the following dressing:

12 ends dark
6 ends light
12 ends dark
12 ends light
6 ends dark
6 ends light
6 ends dark
12 ends light
—
72 ends in repeat of pattern.

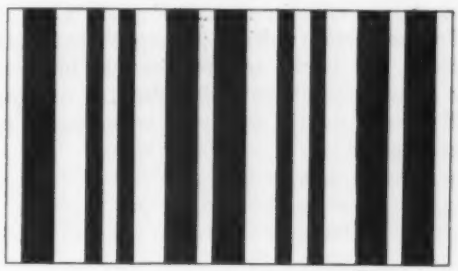


Fig. 5

If dealing with a still better fabric, for example, 84 warp threads per inch, and wanting to produce the same size stripe effect in the fabric, as shown in Fig. 5, we will have to use:

16 ends dark
8 ends light
16 ends dark
16 ends light
8 ends dark
8 ends light
8 ends dark

16 ends light

—

96 ends in one repeat of the pattern.

Fig. 6 shows another stripe effect, produced by means of unequal stripes (one repeat of pattern = one inch), calling for its production in the fabric on a texture of 42 warp threads for the following dressing:

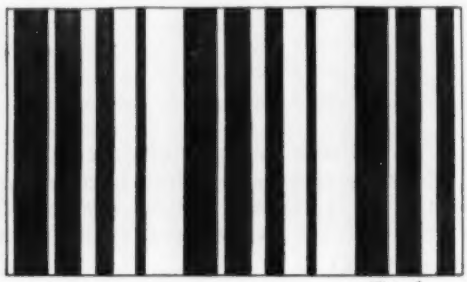


Fig. 6

8 ends dark
2 ends light
6 ends dark
4 ends light
4 ends dark
6 ends light
2 ends dark
10 ends light

—

42 ends in repeat of pattern

In connection with 64 warp threads per inch in the fabric, and required to produce the same stripe effect in the fabric, in turn we will have to use the following arrangement of dressing:

14 ends dark
3 ends light
9 ends dark
6 ends light
6 ends dark
9 ends light
3 ends dark
14 ends light

—

64 ends in repeat of pattern.

Using the following dressing:

16 ends dark
4 ends light
10 ends dark
8 ends light
8 ends dark
10 ends light

4 ends dark
16 ends light

—

76 ends in repeat of pattern,

and this in connection with a warp texture of 76 threads per inch will produce the same effect in the fabric.

Frequently we find, in connection with ginghams, printed yarns introduced, and in order to explain the affair, the accompanying illustration, Fig. 7, representing such a fabric, is given, to be produced on a texture of 84 warp threads per inch with the following dressing:

2 ends light 6 ends dark	× 8 = 64 ends
2 ends light	2 ends
10 ends dark	10 ends
4 ends print	4 ends
10 ends light	10 ends
10 ends dark	10 ends
8 ends print	8 ends
10 ends dark	10 ends
10 ends light	10 ends
4 ends print	4 ends
10 ends dark	10 ends

—

142 ends in repeat of pattern, 1 11/16 inches wide in fabric.

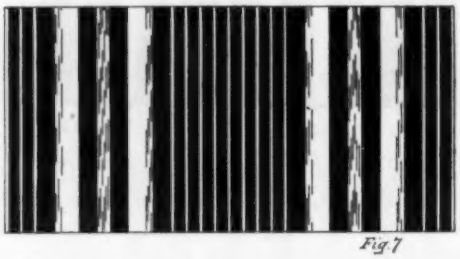


Fig. 7

Fig. 8 shows a balanced check effect—3 1/2 repeats of the pattern in one inch of the fabric warp and filling ways.

The arrangement of colors in warp and filling in connection with a texture of 42 × 42 is thus:

6 ends light
6 ends dark

—

12 ends in repeat of pattern, warp and filling ways.

If required to produce the same effect in

the fabric in connection with the better texture, say 70 × 70, we will have to arrange warp and filling:

10 ends light
10 ends dark
—
20 ends in repeat of pattern, warp and filling ways.

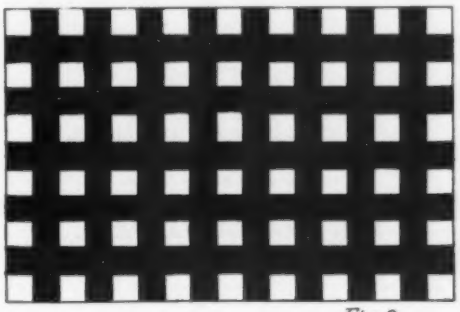


Fig. 8

A still better texture, say 84 × 84, will call for 12 ends light to alternate with 12 ends dark both in warp and filling.

Fig. 9 shows a somewhat larger check effect, calling for two repeats of the pattern in one inch of the fabric, both warp and filling ways.

In connection with a coarse texture, say 40 × 40, we will have to arrange warp and filling:

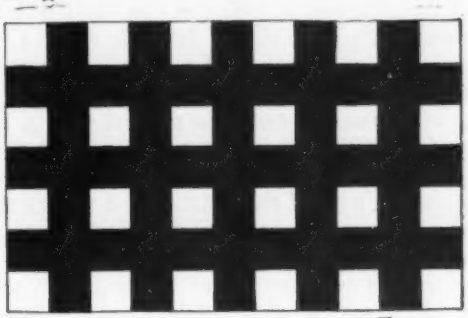


Fig. 9

10 ends light
10 ends dark
—
20 ends in repeat of pattern, in order to produce the effect required.

Using 12 ends light to alternate with 12 ends dark, warp and filling ways, and this in connection with a texture of 84 × 84, will give us the same size check as shown in Fig. 9. In the same manner texture 64 × 64 in connection with

16 ends light
16 ends dark
—
32 ends in repeat of pattern, warp and filling ways, will produce the same effect in the fabric. Using a high texture, say 80 × 80, in connection with effect shown in Fig. 9, will call for 20 ends light to alternate with 20 ends dark, warp and filling ways.

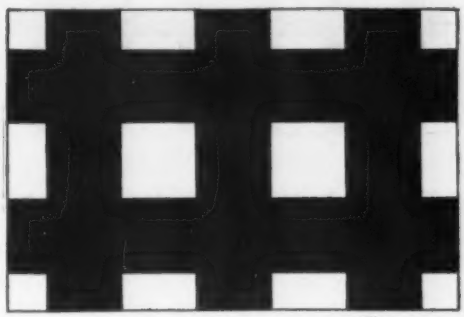


Fig. 10

A heavier check, frequently met with, is shown by means of fabric sketch Fig. 10, the same having two repeats of the pattern in four inches of fabric, both warp and filling ways. In connection with a texture of 42 × 42, use the following dressing:

16 ends light
16 ends dark
—
32 ends in repeat of pattern.

If dealing with a better fabric, i. e., using a heavier texture, say for example 64 × 64, use 24 ends light to alternate with 24 ends dark, warp and filling ways. This amount of threads for each effect will have to be increased as the texture increases, for example, if calling for a texture of 80 × 80, we have to use 30 ends light to alternate with 30 ends dark, warp and filling ways.

In Fig. 11 we show a fabric sketch in which the light color predominates, the repeat of the pattern calling for 2/5 of an inch, i. e., a check of 2/5 of an inch in size is produced with the following textures:

For texture 45 × 45 use 6 ends dark to alternate with 12 ends light for warp and filling; for texture 60 × 60 have 8 ends dark alternat-

ing with 16 ends light in warp as well as filling; and with a texture of 75 × 75 have 10 ends dark alternating with 20 ends light in order to produce fabric sketch Fig. 11 in actual size.

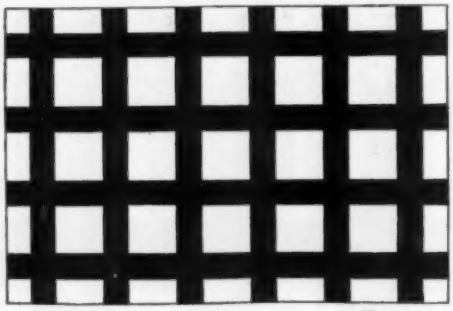


Fig. 11

Fig. 12 shows what we technically call a double line check, repeating on 7/16 of an inch, and which with a texture of 41 × 41 is produced by means of the following arrangement of colors in warp and filling:

4 ends dark
2 ends light
4 ends dark
8 ends light

—

18 ends in repeat of pattern.

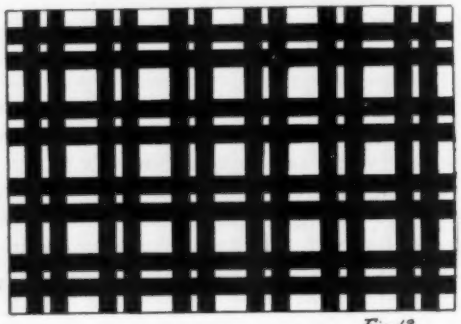


Fig. 12

If referring to a better class of fabric, say for example, texture 60 × 60, the following arrangement of warp and filling will have to be used in order to produce fabric sketch Fig. 12 actually:

6 ends dark
2 ends light
6 ends dark
12 ends light

—

26 ends in repeat of pattern, warp and filling ways.

If said sketch has to be applied for extra fine gingham, say for example, texture 82 × 82, the following arrangement of warp and filling has to be made use of:

8 ends dark
4 ends light
8 ends dark
16 ends light

—

36 ends in repeat of pattern.

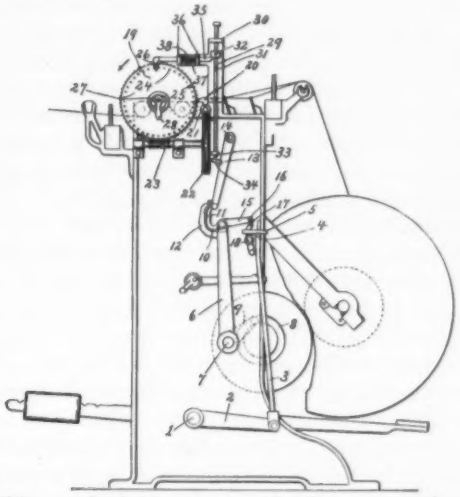
(To be continued.)

AN IMPROVED MEASURING MECHANISM FOR DRAPER WARPERS.

The object of the mechanism is to provide a simple and efficient measuring motion, which may be set to measure a certain number of yards of warp and which will automatically stop the warper when the required amount has been wound on to the warp beam. The mechanism acts in connection with the regular thread stop motion, and its connection on the machine is shown in the accompanying illustration, which is an end view of a warper with its parts shown in their relation to each other.

In the figure, 1, indicates the shaft which operates the belt shifter (not shown). On this shaft, 1, is connected a lever arm, 2, the other end of which is jointed to a vertical rod, 3. Near the top end, this vertical rod, 3, is provided with a shoulder, 4, which when the warper is running, remains pressed against the under side of the plate, 5. A vibrating arm, 6, centered at 7, and which gets its motion from the cam, 8, through the lever, 9, carries a bell crank lever, 10, one lever, 11, of which extends upward between the bent piece, 12, of the vibrating arm, 6, and the end of the vibrating lever, 13, centered at 14. The other end, 15, of the bell crank lever, 10, extends out horizontally and carries a pin, 16, which when the arm, 11, is held firmly, just goes over the lever, 17, centered at 18, the other end of which presses against the vertical rod, 3. If the lever, 13, is prevented from vibrating, the arm, 11, is freed and the

other arm, 15, falls because of its weight, and the pin, 16, comes behind the lever, 17, and pulls it forward, thus causing the other end to press the vertical rod, 3, back which frees it and through connection mentioned stops the machine.



The principal parts of the measuring motion consist of a disk, 19, which is driven from the measuring roll, 20, through the worm, 21, the gear, 22, and the worm, 23, through connections shown. It is provided with holes, 24, to receive a peg, 25, which comes against a projection, 26, during a revolution and pulls it forward. The disk, 19, is centered on an eccentric, 27, which has a handle, 28, and can thus be raised out of contact with the worm, 23, and set in any desired position by hand. A bracket, 29, on the frame has a guide, 30, for an upright headed slide-rod, 31, provided with a collar, 32, and having its lower end guided by a fixed collar, 33, on the main frame, the lower end of the slide-rod, 31, being normally held out of the path of a lug, 34, on the vibrating arm, 13, by an arm, 35, which is slidably mounted in guides, 36, on an arm, 37, of the bracket, 29, and a spring, 38, inserted between the guides, 36, on the arm, 35, to keep one end under the collar, 32. The opposite end of arm, 35, is bent downward, at 26, and, as mentioned, it is in the path of movement of the pin, 25, so that when the rotation of the disk, 19, brings the pin, 25, into engagement with the part, 26, the arm, 35, will be drawn out from beneath the collar, 32, thus causing the slide-rod, 31, to descend into the path of the lug, 34, and stop the vibration of the arm, 13, which in turn, through the mechanism before described, stops the machine. By having the proper numbers of teeth in the gears, 22 and 19, and the worms, 23 and 21, correct, one revolution of the disk gear, 19, will represent a certain number of yards wound on the warp beam, the space between the holes, 24, each representing a certain number of yards, thus by selecting a zero point on the disk and setting the peg, 25, in the correct hole, when the correct number of yards have been wound on the beam, the peg will come against the projection, 26, and as explained, the machine will be stopped.

ROLLER COVERING.

The question of covering leather rollers, either solid or shell, as used in the various stages of cotton spinning is a very important one, from the fact that the quality of the yarn produced depends, to a large extent, on the character of the covering of the rollers. Badly covered rollers are a continual source of expense to a mill, since they need recovering more frequently than properly covered rollers, the result being an increased consumption of roller cloth and leather, besides the cost of labor.

A great change has taken place during the last few years in the covering of rollers, the older methods of covering, with the aid of hand tools and appliances, are gradually giving way to up to date machinery which is specially designed with a view to turning out perfect rollers, which will do their work thoroughly and besides last longer. Modern roller covering machinery has during the past few years been extensively adopted, although not without some little antagonism on the part of some roller coverers, as it was believed by some that the trade was threatened; however, as a matter of fact, the object of the mechanical methods of covering rollers as used in connection with the various stages of cotton spinning, has been to assist the roller coverer in turning out more perfect work.

ROLLER CLOTH.

Before dealing with the various machines

for covering rollers, it will be well to examine into the nature of the material which is used in the covering of rollers, i. e., cloth and leather. A thick woolen cloth is used in the first covering of the rollers, varying in weight from 10 to 26 ounces per yard of 27 inches width, however, the majority of cloths used varying from 16 to 22 ounces, the heaviest being used in the drawing of the heaviest slivers. The cloth should be firm and springy, evenly woven, and well felted.

In the manufacture of the best roller cloth, only the finest and soundest wool should be used, because of the fact that the cloth thus produced is the best, most serviceable, and most economical in the long run. The wool used in the manufacture of this cloth must possess strong felting qualities, since the same, before using, is passed through that process. Wool possessing felting qualities will shrink during fulling and the fibres will mat closely and firmly together, so that the resulting cloth then will have the appearance of felt, because the threads are placed close and besides matted together in the fabric, so that the individual threads are not perceptible to the eye. The production of a level cloth requires that the yarns used in its construction must be carefully carded and spun, and all impurities thoroughly extracted. Care must also be taken when weaving the cloth, to get the correct weight and levelness (cover) in the fabric. The cloth after being woven is then subjected to fulling, being shrunk or felted up to the required width and weight.

Roller cloth produced from an inferior grade of wool, or such a wool in connection with waste, will be of a soft, pliable and fuzzy nature and its surface will become grooved or indented when in place on the drawing rollers, caused by the cotton passing between the rollers, with the pressure on the top rollers. When a roller gets into this condition, it cannot perform the work properly, and consequently has to be recovered, which of course will result in an increased expense to the mill. On the other hand, a stiff, hard cloth, especially if a stiffening constituent has been used in the finishing, will be thinner than is necessary and as a consequence the diameter of the roll will be smaller and then the leather cot will not fit it tightly, or, if it is put on tightly, in all probability the cloth will become loosened and break the joint of the leather cot. There would also be no spring or cushioning effect in the roller and one of the most important points aimed at in connection with roller covering would be lost.

In selecting roller cloth, it is a mistake to conclude that very white cloth is necessarily a good one, since the reverse is frequently the case, for if inferior wool or waste is used and a white fabric is required, a greater amount of bleaching is necessary, a feature which to some extent is detrimental to the durability of the fibres, and for which reason, in this instance, the unbleached roller cloth is superior. Although not so sightly it will wear better. As mentioned before, an inferior cloth will very soon groove or wear hollow by the passage of the sliver, whereas a covering of good cloth will outlast several leather coverings on the same roller.

It is the general practice in preparing the cloth for the roller, to tear it up into strips of the required width, but which is a bad practice, because the tearing has a harmful effect upon the edges of the cloth for quite half an inch inwards, as the web is disturbed, the strands being drawn out of position and elongated, besides leaving the edges soft, raw and fluffy, the result of which is that, when mounted on the roller, the cloth gradually tapers at each end and thus produces an uneven covering. For this reason the cloth should be cut with a sharp knife, either on a cutting board or mechanically. By cutting the cloth, the web is undisturbed and the exact width may be cut, so that the edges do not require trimming, thus saving material. Cut cloth, when mounted on the roller forms a true surface, and the full width of traverse may be taken advantage of; the rollers may also be ended more neatly.

ROLLER LEATHER.

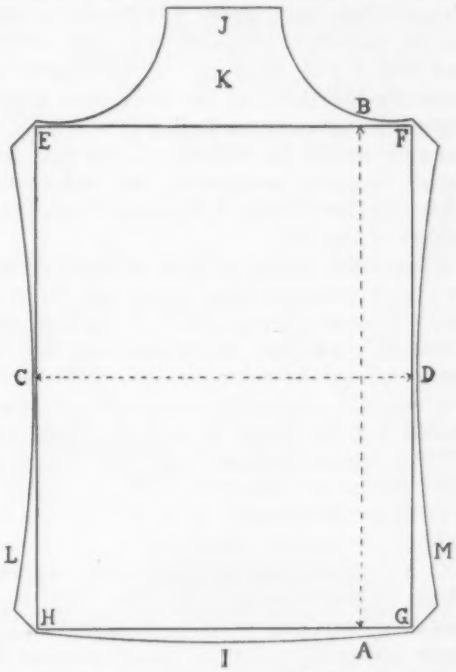
The proper selection of roller leather requires a knowledge of the merits of the various kinds of skins to be found in the market, although the price of the skins may have to be taken into consideration, to some extent, to assist in the selection. It is practically impossible to have two makes of leather exactly

alike, owing to their difference of manufacture, and when consequently the working qualities of the leathers will be different. Before buying the skins, if possible, it is a good plan to get samples of the leather, and after properly marking the cots thus made from them, so that they may be afterwards easily recognized, cover rolls with them and allow the different sample cots, if possible, to be run on the same machine, and noting which samples wear the longest. A good idea of the quality of the leather is gained by this means, although it must not be taken always for granted that the sample represents the quality of the entire lot of leather under consideration.

Then again, certain qualities of leather are more adapted for one or the other machines where cots are needed, so that before selecting the leather for covering rollers, we must ascertain where they are to be used, and then we may make use of certain practical rules. For low or coarse counts of yarn, a cheap quality of skin will answer satisfactorily, for medium counts, select a medium quality of skin, while for high or fine counts, only the best and finest skins should be selected. Rollers for the drawing frame, and for the preparatory machines in combing, require the heavy, large skins, the side portion of which may be used for the rollers in the slubber or intermediate. For slubbing, intermediate, and roving frames, for coarse work, the medium heavy large skins are used, whereas for fine intermediate, roving, jack, and detaching rollers, medium heavy, but small skins are most adapted. These are also largely employed for coarse spinning frames. For fine spinning frames the fine light small skins are best.

Large sized skins are always of thick substance, from the fact that a healthy sheep will naturally have a thick skin, and it is a bad policy to ask for large skins of thin substance, because when skins are made thin by shaving, the fibrous structure of the skin will suffer in strength. When a skin of thin substance is wanted, get a lamb's skin, which is fine, thin and delicate, and very suitable to be used for working fine fibres, whereas the skin of a full grown sheep is thick, coarse and rough, and should be used on rolls in the preparatory machines, like sliver and ribbon lap machines, combers and drawing frames only.

In purchasing skins, they should all measure over a minimum measurement determined on, or at least be equal to it, that is, each skin must measure so many inches long and so many inches wide or more, and these measurements should be taken across the narrowest points, both lengthwise and across the skin. A diagram of the shape of the skin



is shown in the accompanying illustration, with lines to indicate the proper measurements to be taken. The dotted line A-B represents the shortest length from shoulder to butt, and C-D the narrowest width across the skin. The calculation for the number of cots to a skin is made from the rectangle E F G H. In some instances, the skins are measured from I to J or I to K and L to M, which of course would only give an approximately correct result. The neck portion of the skin should not be measured, as it is unsuitable for roller covering, owing to the faults in it. The flesh side of the skin will always reveal any defects, like butcher's knife cuts, over shaving, etc., in it, however, in the best grades of skins these defects should not be

present as they are detrimental to good work in spinning high class yarns, whereas for machinery spinning lower counts of yarn, many flesh and grain defects in the skin will pass on. Another serious defect to a skin is the presence of fine hairs on it, and which skins should be rejected, the same if the skin feels rough and harsh when spread out flat on a table, the latter being an indication that the skin is not level and such a skin cannot be used in connection with fine or medium spinning. When handled, the skin should be very pliable, but when taken between the thumb and finger and these moved alternately in opposite directions, at the same time applying a little pressure, no feeling of looseness in the skin should be noticed. If the face side cannot be easily separated by just nicking the edge and then pulling, it is considered a good feature of the skin.

As we have intimated, it is an impossibility to obtain perfectly even skins, but there is much difference between a badly finished and a well finished skin. An untrue skin may be made true by the roller coverer, which process we will deal with later. Good skins should not feel harsh or hard, but soft and pliable, the surface well polished, and free from cracks and fissures. What is required is a leather calculated to assist the cloth in its resilient or cushion effect upon the sliver; with a hard, unyielding leather the resilient effect is neutralized, and there will be a tendency for both cloth and leather to become indented. A very good practice in mills is that of adopting several standard sizes of skins which experience has shown to contain the desired range in the thickness and substance of the leather for the different machines. The actual measurements of each standard being those which will provide the maximum number of covers for the several sizes of rollers it is intended for.

(To be continued.)

FEED ROLLER STOP MOTION FOR WHITIN COMBING MACHINES.

The lap of cotton, which is fed to the comber from a roll placed at the back of the machine, is sometimes broken in its passage to the combing mechanism and winds around the feed roll, to such an extent that some of the parts like nipper bars, half laps, etc., are broken before the operative can stop the machine. The object of this stop motion is to stop the rotation of the lower feed-roll as soon as possible after the delivery of the lap is interrupted by the winding of the lap on the feed roll, which is accomplished by having the feed roller gear automatically move out of the mesh with the driving gear when the winding of the lap occurs. The method of operation of the stop motion is shown by the accompanying illustrations, Figs. 1

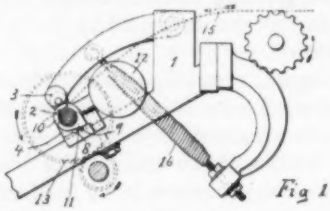


Fig 1

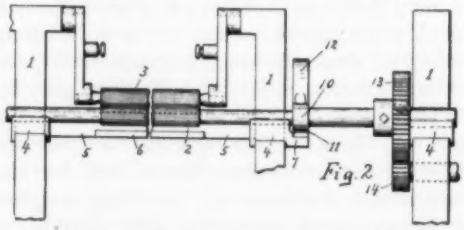


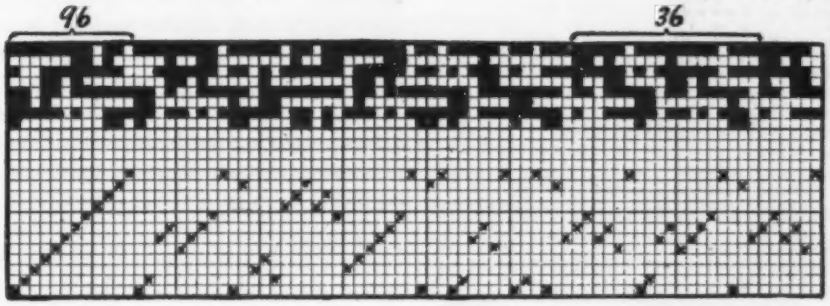
Fig. 2

and 2, and of which Fig. 1 is a view, partly in section, taken transversely through one of the sections of a comber, showing the feed rolls and the safety attachment connections. Fig. 2. is a longitudinal skeleton view showing the principal features of the motion. A description of the operation of the motion is best given by quoting numerals of reference accompanying the illustrations and of which 1 indicates the end frame of a section of a comber; 2, the driven feed roll; 3, the top feed roll; 4, the bearings for the driven feed roll which has only the lower half of its circumference encased, and 5, is the bar on which the cushion plate, 6, is supported. One of the bearings, 4, has the extension, 7, provided with the notches, 8 and 9, and on the driven feed roll, 2, above the extension, 7, is placed the loose collar, 10, provided with a pawl, 11, which is shaped so as to engage with the notches, 8 and 9. To the collar, 10, is also connected the counterweight, 12. In

its normal condition, the pawl, 11, on the collar, 10, bears on the extension, 7, and supports the counterweight, 12, in the raised position. Secured to the driven feed roll shaft near its end, is the gear, 13, which is driven by the pinion, 14, thus giving rotation to the feed roll, 2. The lap of cotton is indicated by a dotted line, 15, and when it breaks and laps around the feed roll, 2, the cotton will be crowded between the bar, 5, and the cushion plate, 6, so quickly and so tight that frequently these parts, and particularly the cushion plate, are broken. The counterweight, 12, somewhat counteracts the tension of the coiled springs, 16, which hold the top roller in contact with the bottom roller so that when the lap winds around feed roller, 2, and causes the shaft to rise in its journal bearings, the counterweight, 12, causes the pawl, 11, to engage first with the notch, 9, and then with the notch, 8, in this manner lifting the shaft of the driven feed roll and disengaging the gear, 13, from the pinion, 14, and thus stopping the feed rollers until the operator stops the machine.

NOVELTIES FROM FOREIGN SOURCES.

Worsted Trousering.



Complete Weave. Repeat 28 × 12.

Warp: — 7,370 ends, 18 harness fancy draw, all 2/60's worsted.

Reed: — 16 × 7 = 65¾ inches wide in loom.

Dress: —

1 end, black	= 1 end.
4 ends, pearl and gray twist	= 4 ends.
1 end, black 1 end, pearl and gray twist	× 2 = 4 ends.
1 end, pearl and gray twist 1 end, black	× 2 = 4 ends.
2 ends, black 1 end, pearl and gray twist	× 2 = 6 ends.
1 end, pearl and gray twist	= 1 end.
1 end, black	= 1 end.
2 ends, pearl and gray twist 1 end, black	× 2 = 6 ends.
1 end, black	= 1 end.

Repeat of pattern: 28 ends.

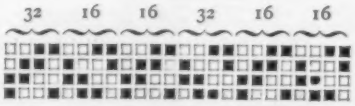
Filling: — 97 picks per inch, arranged thus:

1 pick, 2/60's worsted, black.
1 pick, 3 run woolen yarn, black.
1 pick, 2/60's worsted, black.

3 picks, repeat of pattern.

Finish: — Worsted finish, scour well, shear clear, 56 inches wide.

Woolen Cheviot Suiting (Check).



Complete Weave. Repeat 128 × 4.

Warp: — 1,395 ends.

Reed: — 11¼ × 2 = 63½ inches wide in loom.

Dress: —

2 ends, 2½ run, woolen cheviot, gray mix 1 end, 2½ run, woolen cheviot, blue green 1 end, 2½ run, woolen cheviot, green 2 ends, 2½ run, woolen cheviot, gray mix 1 end, 2½ run, woolen cheviot, blue green 1 end, 2 ply 4 run, double and twist, woolen cheviot, black and white	× 6 = 48 ends.
2 ends, 2½ run, woolen cheviot, gray mix	= 2 ends.
1 end, 2½ run, woolen cheviot, blue green	= 1 end.
1 end, 2 fold, 5 run, woolen cheviot, yellow	= 1 end.
2 ends, 2½ run, woolen cheviot, gray mix	= 2 ends.
1 end, 2½ run, woolen cheviot, blue green	= 1 end.
1 end, 2 ply 4 run, double and twist, woolen cheviot, black and white	= 1 end.
2 ends, 2½ run, woolen cheviot, gray mix	= 2 ends.
1 end, 2½ run, woolen cheviot, blue green	= 1 end.
1 end, 2 fold 5 run, woolen cheviot, light red	= 1 end.
2 ends, 2½ run, woolen cheviot, gray mix	= 2 ends.
1 end, 2½ run, woolen cheviot, blue green	= 1 end.
1 end, 2 ply 4 run, double and twist, woolen cheviot, black and white	= 1 end.

Repeat of pattern: 64 ends.

Filling: — 27 picks per inch, arranged thus: —

1 pick, 2 ply 4 run, double and twist, woolen yarn, dark red.
7 picks, 2½ run, woolen cheviot, black.
1 pick, 2 fold 5 run, woolen yarn, orange.
79 picks, 2½ run, woolen cheviot, black.

88 picks. Repeat of pattern.

Finish: — Cheviot finish, scour well, 56 inches wide.

Woolen Cheviot Suiting.

Complete Weave.

Repeat 4 × 4.

Warp: — 1,920 ends.

Reed: — 15 × 2 = 64 inches wide in loom.

Dress:—

1 end, 2 ply 6 run, double and twist, woolen cheviot, black and white.....
1 end, 2 ply 4 run, double and twist, woolen cheviot, black..... } × 2 = 4 ends.
1 end, single 4 run, woolen cheviot, black..... = 1 end.
1 end, 2 ply 4 run, double and twist, woolen cheviot, black..... = 1 end.
1 end, 2 ply 6 run, double and twist, woolen cheviot, black and blue..... = 1 end.
1 end, 2 ply 4 run, double and twist, woolen cheviot, black..... = 1 end.
1 end, 2 ply 6 run, double and twist, woolen cheviot, black and white..... = 1 end.
1 end, 2 ply 4 run, double and twist, woolen cheviot, black..... = 1 end.
1 end, single 4 run, woolen cheviot, black..... = 1 end.
1 end, 2 ply 4 run, double and twist, woolen cheviot, black..... = 1 end.

Repeat of pattern: 12 ends

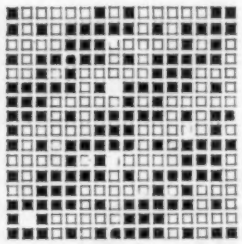
Filling:—34 picks per inch arranged thus:—

1 pick, 2 ply 4 run, double and twist, woolen cheviot, black..... = 1 pick.
1 pick, single 4 run, woolen cheviot, black..... = 1 pick.

Repeat of pattern: 2 picks.

Finish:—Cheviot finish, scour well, shear clear, 56 inches wide.

Melton Suiting.



Complete Weave.
Repeat 16 × 16.

Warp:—5,310 ends.

Reed:—19 × 4 = 70 inches wide in loom.

Dress:—

2 ends, 2/64's worsted, green..... = 2 ends
16 ends, 2/64's worsted, black and white twist, twisted with 32's worsted, black..... = 16 ends.
2 ends, 2/64's worsted, black, twisted with 2/40's cotton, white..... = 2 ends.
2 ends, 5¼ run, woolen yarn, black..... = 2 ends.
2 ends, 2/64's worsted, black, twisted with 2/40's cotton, white..... = 2 ends.
16 ends, 2/64's worsted, black and white twist, twisted with 32's worsted, black..... = 16 ends.
2 ends, 5¼ run, woolen yarn, black..... = 2 ends.
2 ends, 2/64's worsted, black, twisted with 2/40's cotton, white..... } × 2 = 8 ends.
2 ends, 5¼ run, woolen yarn, black.....
16 ends, 2/64's worsted, black and white twist, twisted with 32's worsted, black..... = 16 ends.
2 ends, 2/64's worsted, black, twisted with 2/40's cotton, white..... = 2 ends.
2 ends, 5¼ run, woolen yarn, black..... = 2 ends.
2 ends, 2/64's worsted, black, twisted with 2/40's cotton, white..... = 2 ends
16 ends, 2/64's worsted, black and white twist, twisted with 32's worsted, black..... = 16 ends.
2 ends, 5¼ run, woolen yarn, black..... = 2 ends.
2 ends, 2/64's worsted, black, twisted with 2/40's cotton, white..... = 2 ends.
2 ends, 5¼ run, woolen yarn, black..... = 2 ends.
2 ends, 2/64's worsted, black, twisted with 2/40's cotton, white..... = 2 ends.

Repeat of pattern: 96 ends.

Filling:—75 picks per inch, arranged thus:—

2 picks, black and white twist, twisted with 32's worsted, black..... = 2 picks.
56 picks, 5¼ run woolen yarn, black..... = 56 picks.
2 picks, black and white twist, twisted with 32's worsted, black..... = 2 picks.
4 picks, 5¼ run woolen yarn, black..... = 4 picks.

Repeat of pattern: 64 picks.

Finish:—Melton finish, scour well, full slightly, 56 inches wide.

HOW TO PREPARE THE PROPER DRAWING IN DRAFT AND HARNESS CHAIN FOR A FANCY WEAVE.

To make out the proper drawing in draft for a fancy weave requires a thorough understanding of the construction of the particular weave under consideration, since otherwise, in many instances, hard drafts will occur; resulting in turn in hard work for the weaver and frequently in a loss to the manufacturer by means of "wrong draws" in the cloth. Any fancy drawing in draft should be of such a character that the weaver can keep the same readily in his memory, in order to quickly re-tie any broken threads during weaving. Making out the proper drawing in draft is a feature frequently neglected in a mill, may it be from carelessness or lack of knowledge on the part of the person attending to that affair, this being more particularly the case in mills where no regular designer is employed.

We will next explain the principles of making out a fancy drawing in draft and afterwards consider the subject of how, in some instances, a fancy drawing in draft can be readily made too hard for practical work, by not understanding the construction of the weave.

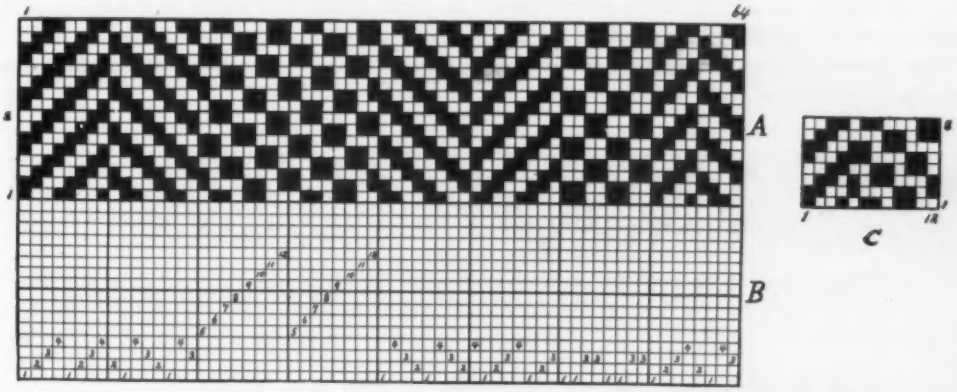
RULE FOR MAKING OUT DRAWING IN DRAFT FOR A FANCY WEAVE.

Ascertain the repeat of the new weave in the direction of both systems of threads; next, examine each warp thread separately (on the design) as to its rotation of interlacing in the filling.

Every warp thread interlacing the same (on the same picks throughout its repeat in the weave) as one before can be drawn on the same harness; whereas, every warp thread not working the same as one before requires a new harness. This rule will hold good for any weave,

single or double cloth. To give a clear understanding of this subject, the accompanying illustrations A and B are given.

A represents a fancy weave repeating on 64 warp threads and 8 picks. B illustrates the fancy draft necessary to produce this weave on 12 harness (being the lowest number of harness to reduce this weave).



For drafting the fancy draw, we always begin at the left hand side and work toward the right, as clearly indicated by numerals, for warp threads 1 and 64 on top of fancy weave A. Examining our weave with reference to the interlacing of warp and filling, we find, beginning with number 1 warp thread, that the second warp thread works different from the first, since the first warp thread interlaces $^{2}{}_{2}{}^{2}{}_{2}$ (in one repeat of the weave, i.e., eight picks), whereas the second warp thread interlaces in the same number of picks (one repeat of the complete fancy weave) thus $_{1}{}^{2}{}_{2}{}^{2}{}_{1}$, for which reason we must draw number 2 warp thread on number 2 harness as clearly indicated by this number in the drawing in draft as given below the weave. In the same manner as dealt with warp thread 2 we have in turn to deal with warp threads 3 and 4, each thread requiring in its turn a new harness.

Warp thread 5 = warp thread 1, hence is drawn on the same harness.

Warp thread 6 = warp thread 2, hence is drawn on the same harness.

Warp thread 7 = warp thread 3, hence is drawn on the same harness.

Warp thread 8 = warp thread 4, hence is drawn on the same harness.

The drawing in draft thus far has been nothing more but two repeats of a straight 4 harness draft, drawn from left to right (i.e., front to rear). Examining warp thread 9, we find the same to interlace $_{1}{}^{2}{}_{2}{}^{2}{}_{1}$ in one repeat of the weave, or similar to warp thread 2, hence this thread is drawn on number 2 harness. In the same manner

Warp thread 10 = warp thread 1.
Warp thread 11 = warp thread 4.
Warp thread 12 = warp thread 3.
Warp thread 13 = warp thread 2.
Warp thread 14 = warp thread 1.
Warp thread 15 = warp thread 4.
Warp thread 16 = warp thread 3.

Warp threads 9 to 16 are thus nothing more but two repeats of a straight four harness draft, drawn from right to left (i.e., rear to front).

Warp thread 17 we find to interlace thus: $_{1}{}^{2}{}_{1}{}^{2}{}_{2}$ in one repeat of the weave, or different than any warp threads previously considered, for which reason we consequently have to draw this thread on a new (number 5) harness. For the same reason

Warp thread 18 calls for a new, i.e., number 6 harness.

Warp thread 19 calls for a new, i.e., number 7 harness.

Warp thread 20 calls for a new, i.e., number 8 harness.

Warp thread 21 calls for a new, i.e., number 9 harness.

Warp thread 22 calls for a new, i.e., number 10 harness.

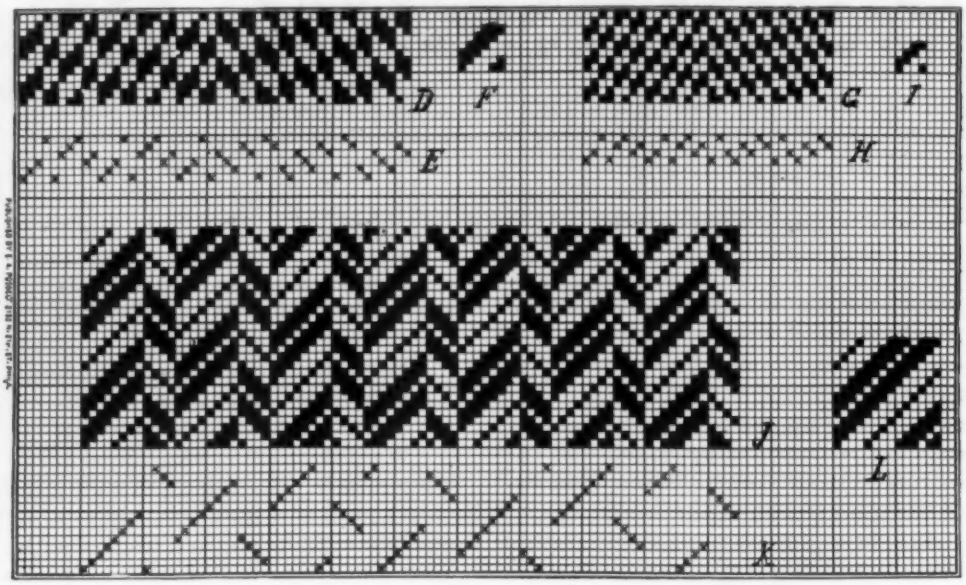
Warp thread 23 calls for a new, i.e., number 11 harness.

Warp thread 24 calls for a new, i.e., number 12 harness.

Warp threads 25 to 32 in turn will be found to be a repetition of warp threads 17 to 24, for which reason they are drawn on the corresponding harnesses.

Warp threads 33 to 40 = straight draw from rear to front on the first four harnesses, and warp threads 41 to 48 = straight draw from front to rear on the same harnesses.

Warp threads 49 to 56 work in pairs (basket weave), on harnesses 1 and 3 respectively.



Warp threads 57 to 60 = warp threads 1 to 4 and warp threads 61 to 64 = warp threads 9 to 12 respectively.

In making out a drawing in draft for practical work, not always the lowest number of harnesses is made use of, since frequently too many heddles would be required for a certain harness; however, any student will know that he can use any time two or more harnesses in place of one. To simplify, a drawing in draft may also not call for the lowest possible reduction in the number of harness for a fancy weave.

HOW TO MAKE OUT THE HARNESS CHAIN.

Rule: Reproduce the interlacing of each warp thread only the first time called for by its drawing in draft on a different harness. Figure C will clearly illustrate the procedure, being the harness chain required for weaving on 12 harness, by means of fancy draft B, the fancy weave A. The harnesses in chain C are numbered correspondingly to the harnesses in draft B, and the picks in the chain with reference to the corresponding picks in weave A. Repeat of harness chain 12×8.

In many instances when making out the draft it will be necessary

TO TAKE THE FOUNDATION OF THE FANCY WEAVE IN CONSIDERATION,

either on account of the capacity of the loom or the proper draft. Both affairs will be dealt with in turn. Diagram D shows one repeat of a fancy weave repeating on 50×6. Diagram E is the proper drawing in draft required to weave said weave on 6 harness. Examining the draft we find that we selected the drafting to suit the weave, the latter being a skip twill:

Take 3 and skip (2 ends)
Take 2 and skip (2 ends) } 5 times / = 25 ends

Take 3 and skip (2 ends) } 5 times \ = 25 ends
Take 2 and skip (2 ends) }

50 ends

The draft is taken correspondingly, i.e., after drawing

Warp thread 1 on harness 1,
Warp thread 2 on harness 2,
Warp thread 3 on harness 3,
Harnesses 4 and 5 are skipped drafting in turn,
Warp thread 4 on harness 6,
Warp thread 5 on harness 1.

Keeping on in this manner of drafting in rotation (either from front to rear or rear to front, as the case may be) and skipping, both items correspondingly to the foundation of the weave, will in turn finish warp thread 50 on harness 4.

Diagram F is the harness chain obtained by means of draft E from weave D, and repeats on 6×6, being the $^{2}/_{3}$ 6 harness twill and which weave has been the foundation weave for fancy weave D.

Diagram D shows another fancy weave, repeat 32×4, diagram H its draft for 4 harness (skip draft according to weave) and diagram I the harness chain, repeat 4×4, being the regular $^{2}/_{2}$ 4 harness even sided twill.

Diagram J shows a more elaborate fancy weave, repeating on 84×14.

Diagram K shows the proper fancy draft (skip draft — to go with the construction of the weave) to use. This example will readily explain to the reader how easy it is to simplify a draft to the weaver. The rule for number of warp threads to skip in the construction of a skip twill is "one half the repeat minus one." Thus in the present instance $14 \div 2 = 7 - 1 =$ 6 number of warp threads to skip to obtain a clear break in connection with the $^{2}/_{1}{}^{3}/_{3}{}^{1}/_{3}$ 14 harness even sided twill. The weave calls for 8/ to alternate with 4\, thus the drawing in draft will call for:—

Draw 8 warp threads straight /,
skip 6 harness,
draw 4 warp threads \,
skip 6 harness, and over again until repeat obtained, being an arrangement readily kept in memory by any weaver.

Diagram L is the harness chain 14×14.

In the same manner as we thus have shown fancy weaves technically known as skip and broken twills, treated so as to get sensible drawing in drafts, other kinds of fancy or combination weaves will have to be treated correspondingly according to their principle of construction, in order to simplify matters for the weaver.

HOW TO ASCERTAIN NUMBER OF HEDDLES FOR EACH HARNESS IF USING A FANCY DRAFT.

Rule: Count the number of threads drawn on a harness in one repeat of a draft and multiply that number by the number of patterns or repeats of the drawing in draft in the warp. For example, suppose fancy weave A calls for 4200 ends in the width of fabric. Question: Ascertain number of heddles required for each harness.

$4200 \div 84 = 50$ repeats of patterns or repeats of the drawing in draft in the warp.

Examining our drawing in draft we find each harness drawn upon six (6) times in one repeat of the pattern; thus $6 \times 50 = 300$ heddles are required for each harness.

PRACTICAL POINTS ON VARNISHING AND CARE OF ROLLERS IN THE DRAW FRAME.

VARNISHING AND THE CARE OF ROLLERS.

The top leather rolls before they are put into the drawing frame have to be varnished, and the frequency of revarnishing them during the life of the leather depends on the kind of varnish used, the method of its application, the weight of sliver run, the speed of the frame, the amount of top roller weighting and the amount of care given the machine.

Under ordinary conditions top rolls should be cleaned and varnished about once a week, the varnish consisting of glue and a fine gritty paint, for preserving the leather and preventing it from becoming too smooth. The reason of this is that the grain of the leather wears away and gets broken, on account of the high speed at which the rolls revolve, and the heavy work they have to do, and when any roughness on the surface of

these rolls causes licking, which in turn results in waste, light sliver and loss in production through stopping the machine to remove roller laps. The natural grain in the leather must thus be reinforced by some sort of a drawing surface, the varnished surface being the one adopted for this purpose.

Well varnished rolls must present a smooth, hard surface, which has dried without cracking and will not cause fibre or dust to adhere to it. Too much glue in the varnish, while giving the rolls the appearance of a highly polished surface, has a tendency to crack when dry; again too little glue will allow the varnish to wear off too quickly. Four standard recipes for varnish are:

No. 1:—

3 oz. glue.
1 oz. acetic acid.
½ tsp. oil of origanum.
½ tsp. brown sugar.

Dissolve and add color, like venetian red, green or lamp black.

Such colorings give the varnish body, saving it from cracking and thus preserving the life of the leather. In hot climates or during hot weather add 1/2 teaspoonful of borax to the above mixture.

No. 2.:

1 lb. best pulverized glue.
1 qt. acetic acid.
1 qt. water.
½ oz. oil of origanum or oil of cloves.
½ lb. venetian red or any other suitable color.

In place of 1 quart each acetic acid and water, 2 quarts good vinegar may be used.

No. 3:—

7 oz. glue.
1 qt. vinegar.
2 tbsp. of gum tragacanth.
1 tbsp. of borax.
1 tsp. of brown sugar.

Cook mixture about an hour and thicken it with lamp black and princess metallic.

No. 4:—

2 qts. of ground glue.
1 oz. sal ammoniac.
2 tsps. of sugar.
1 tbsp. of dissolved gum tragacanth.

Vinegar is used to dissolve the mixture, which when properly dissolved is ready for adding the color and then applying to the rollers.

The methods of putting the varnish on the rolls differ, some roller coverers using for this purpose a brush, in the same manner as you would paint a stick, taking care to spread the varnish evenly over the surface of the leather, so that when it is dry it has a true, smooth surface. This method, with proper care, produces an evenly covered roll, but requires considerable time. Other roller coverers use a board, made slightly longer than the roll and about twice to three times as wide as the circumference of the roll. One side of the board is then covered with felted cloth, which in turn is secured tightly to the board, by being tacked at the edges. The varnish is then, with a brush, put on the cloth and the roll rolled over the surface of the cloth by placing the palm of each hand on either bushing of the roll and rolling the roll backward and forward over the varnish until the whole surface of the roll is evenly coated. This method performs the work quicker than the previous method, but if proper care is not taken, the varnish will not spread evenly on the roll; again the cloth requires scouring after varnishing rolls, since otherwise it will stick to the board, becoming stiff and unfit for future use. Again the varnish may be applied to the rolls by the fingers, and rubbing the varnish well into the roll. This procedure, although requiring more time as compared to the other methods previously quoted, will produce an even and smooth surface, provided an experienced roller coverer does the work.

New rolls or rolls recovered are given 2 or 3 coats of varnish before being put into the frame, taking care to have one coat of varnish perfectly dry before the next coat is added. When dealing with rolls in use, i. e., when varnishing rolls to keep them in proper working condition, one coat of varnish, applied about once a week, will be sufficient when average counts of yarn are to be spun. Sometimes when fine counts of yarn are required to be spun the rolls are given 2 coats of varnish. Rolls must be perfectly dry before putting them back into their places in the drawing frame, since otherwise, as will be readily understood, the cotton would adhere

to them, making it impossible to operate the machine, besides rolls not perfectly dry will become fluted, the bottom rolls then having a good chance to impress their flutes upon the leather top rolls.

It is bad policy to have to grind off the grain of the leather in a newly covered roll in order to true the same up, and then varnish the roll to reproduce the grain that has been ground off, as it is a wrong principle. It will be better to devote more time and care to perfect covering of the rolls, instead of thus laying the foundation for loss to the mill, both on account of bad work done, as well as shortening the life of the roll.

Rolls like any other important factor in any machine must be kept clean. The flutes of the bottom rolls collect dirt readily and if not watched and kept clean will soon become sticky, a feature which in turn will cause licking and consequently laps. For this reason these fluted bottom rolls, as soon as becoming dirty and unfit for perfect work, must be taken out of the frame and scoured first with pumice stone, then with oil and afterwards with whiting. In some instances the scouring with oil is omitted. While the bottom rolls are out of the machine, and this previous to scouring them, the flutes must be carefully gone over and any rough or knocked places seen must be smoothed, either with a special flute file or rubbed down lightly with fine emery cloth before the scouring is commenced. While the rolls, for the purpose of scouring them, are out of the machine, it is a good plan to then clean the boxes the rolls run in, as well as any other portions of the machine in general.

Balbriggan is the name of a town in County Dublin, Ireland, which is credited with having originated the variety of goods that now bears its name. Here in the year 1845 the Smythe family first started the manufacture of a fine class of full-fashioned hosiery from unbleached cotton. It was knit of carefully spun yarn, and was of both medium and very fine grades. The goods obtained a great celebrity throughout Europe on account of their sterling qualities and the manufacture still continues at Balbriggan by the descendents of the original Smythe.

DYEING OF SULPHUR COLORS ON PIECE GOODS.

The ideal method for this class of goods is to make use of a continuous machine provided with several compartments, two at least being for the dye liquor, and the remaining compartments for washing. The machine is best made of cast iron, but wood will answer, provided it is without brass or bronze fittings, as these are readily corroded. The rollers should be covered with cloth or burlap.

The goods are made ready for dyeing by previously boiling or they may be run dry. The speed of the machine for the average sulphur color should be such as to permit of an immersion of about five minutes in the boiling dye liquor. As a rule the temperature of the dye bath seldom exceeds 195° F., although good penetration is secured with some classes of goods at as low as 125° to 140° F.

The one great defect of machine dyeing with the sulphur colors is the tendency to rub. This is due not to any defect of the dyestuff that may be used, but to a lack of treatment in washing, and a dyeing at a temperature below that best adapted for the particular dye used.

Jigger dyeing is gaining favor, as it enables the pieces to be worked in a bath of much greater strength than the continuous machine. The jigger is very economical, as the first wash water containing considerable color, may be added to the bath and used for bringing it up to the proper working level, with the addition of more color.

Dyeing by complete submersion in the dye liquor is the ideal method for the sulphur colors, and should be adopted by large manufacturers whenever possible. By such means the time of immersion is always under the control of the dyer and the temperature of the bath always maintained at the maximum.

Although great progress has been made in the development of the sulphur colors, their practical application from a mechanical standpoint has not progressed at the same rate.

It is said that taffeta silk has been in use in Europe for more than 600 years.

CORRESPONDENCE AND NOTES

Upon Textile Topics at Home and Abroad.

FINISHING WOOL AND MIXED FABRICS.

XXIX.

BY N. REISER.

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TREATMENT IN HOT WATER.

Two separate processes are included under this head: First, winding the cloth on rolls and immersing it in hot water; second, winding the cloth on rolls that are rotated in boiling water.

By the first method the cloth is wound on perforated rolls, care being taken to have the goods placed smoothly on the rolls, free from wrinkles and folds. The goods are then immersed in water which should not stand more than eight to twelve inches above the top of the roll. The rolls should be placed so as not to touch each other; the temperature of the water varies from 80 to 150 deg. F. according to the color of the goods. If the water is used at a higher temperature the goods are likely to handle dry. It is a good plan to turn the rolls partly round every two hours in order to bring a uniform water pressure upon all parts of the cloth.

It is not possible to obtain as high a lustre with the hot water as with the steam finish. The lustre by the former process is duller and the cloth is softer and somewhat dryer. White pieces which are to be colored light shades should not be treated in hot water as this process injures the resulting color.

There are three degrees of steam or hot water finishing: high lustre, half lustre and dull finish. The degree of lustre obtained depends upon the following factors:

1. Raw material. The finer this is, the better it is scoured and the less the natural qualities of the fibre are affected by the scouring, carbonizing, coloring and drying, the better will be the finish of the goods.

2. Size of the yarn. The finer the yarn is spun, the smoother will be the face of the goods and, consequently, the higher the resulting lustre.

3. Weave. The nearer parallel the threads lie, the higher is the lustre.

4. Finish of the goods. As a matter of course, cloth with a well-raised and well-laid nap will take a higher lustre than if the face is sheared close.

5. Preliminary pressing. The harder the goods are pressed and the higher the temperature during the operation the higher will be the lustre. A better lustre is obtained on some goods by first pressing them in a plate instead of a cylinder press before treating in water.

FINISH WITH A HIGH LUSTRE.

Both napped and closely sheared cloths can be finished with a high lustre. In the case of napped, or so-called face goods, the lustre depends in great measure upon the gigging process, which has been already described. The goods are well brushed to lay the nap, cropped, and then pressed hard at a high temperature in the hydraulic press. They are then decatized, either with plates, dry steaming on rolls, or in hot water on rolls. Cloth with the face sheared close naturally takes less lustre than do face goods. Satin, doeskin and corkscrew weaves are best adapted for a close sheared lustre finish.

HALF-LUSTRE FINISH.

As its name implies, half finish is one having a medium lustre. For this finish a medium process is required. For the half-lustre finish on face goods the cloth should not be so wet when gigged as when a high lustre is required, and the pieces are not pressed so hard nor steam-blown so long or at so high a temperature. This refers to fine goods.

Coarse cloths on the contrary can be pressed and decatized harder without receiving so high a lustre as in the case of fine goods. This is due to the fact that there are less fibres on the face of coarse goods.

DULL FINISH.

For this effect napped goods should not be gigged wet. The pressing should be light and after steam brushing to remove the press lustre, the pieces should be steam-blown slightly. It is often sufficient if the steam is turned off as soon as the steam has penetrated the cloth on the roll. After decatizing, the pieces are unwound and folded back and forth several times on a table to cool them.

THE EFFECT OF STEAM FINISH ON THE STRENGTH AND ELASTICITY OF THE GOODS.

A very high temperature during the steaming process injures woolen goods. In order to determine the exact effect of this finish on the fibre twelve different tests were made on white goods with a white 4-leaf twill fabric which had been previously fulled. It was found that this method of finishing is liable to injure the fabric. This injury is not only in proportion to the time during which the steam is passing through the goods, but also to the time during which the goods are left on the rollers. As every finisher knows, it makes a considerable difference in the finish whether the goods are unwound directly after steaming or left on the rolls for some time. The length of time cloth is left on the rolls varies widely according to the lustre desired, sometimes they are taken off in ten minutes and at other times left until the cloth is cooled.

The tests referred to were made with cloth woven from pure Buenos Ayres wool. The goods were treated on upright rolls. Before the treatment the cloth indicated a strength of 201.3 pounds and an elasticity of 46 per cent. The results of the experiments were as follows:

Duration of Steaming Process	Time for which Goods were Left on Rolls	Strength	Elasticity
10 minutes	Unwound immediately	199.1 lbs.	45 per cent
10 "	4 hours	196.3 "	44.5 "
20 "	Unwound immediately	197.2 "	43.8 "
20 "	4 hours	194.3 "	43 "
30 "	Unwound immediately	195.2 "	42
30 "	4 hours	192.5 "	40.4
1 hour	Unwound immediately	193 "	39.2
1 "	4 hours	191.4 "	38.4 "
1½ hours	Unwound immediately	191.8 "	37.6 "
1½ "	4 hours	189.6 "	36.4 "
2 "	Unwound immediately	190.3 "	35.2 "
2 "	4 hours	188.1 "	34 "

According to these experiments the cloth lost 5 per cent. of strength and 11 per cent. of elasticity. The duration of the steaming process did not seem to injure the fabric in either case as much as did the leaving the goods on the roll for four hours. Taking the seventh test, for example, in which the cloth was steamed for one hour, we find that the strength was 193 pounds. By the previous test in which the cloth was steamed for thirty minutes and left four hours on the roll the strength was one-half pound less. We find a rather large difference in all of the tests as far as strength is concerned. The elasticity is affected more regularly. Five trials were made for each test and the average taken as the result.

COLORING STEAM FINISHED GOODS.

Steam finished woolen goods do not absorb coloring matter as readily as before being steamed. In other words, with the same dyeing process the shade of the steam finished fabric will be lighter. On the other hand, steaming goods already colored has a tendency to darken the shade.

It cannot be denied that during the last thirty years dyeing is the art that has witnessed the highest development, particularly since the introduction of the aniline and alizarine dyes. Unfortunately the use of these new materials has not been accompanied by a corresponding increase in the fastness of the colors produced. When we examine the old collections of textile fabrics which were manufactured at Montjoie in the eighteenth century, also the collection of about eight hundred samples of cloths made at Verviers about the year 1575, the latter collection being now in my possession, and finally old Gobelin tapestries and other fabrics produced about the beginning of the Christian era, we find that the colors in all these goods have changed very little if any. It is very doubtful indeed, however, if posterity will be able to say the same of our new colors.

The cause of the deficiency in our present

colors lies first, in the cheap, rapid methods of dyeing, and second, in the difficulty of coloring carbonized wool with iron and wood colors. Many manufacturers find that it is not necessary to make their colors fast in order to sell their goods. Where fastness is a requisite, indigo, wood, iron and alizarine dyes are still used. Alizarine dyes have proved very fast and are generally used for worsted top and piece goods. The dyeing process required for alizarine dyes does not injure the spinning qualities of the fibre and the colors are very fast. The application of alizarines to piece dyes is more difficult, but on account of the solidity of the color they are much employed for this branch of dyeing. Upholstery, carpets and curtains should always be colored with fast shades. It is unpardonable to have these goods so poorly dyed that the colors bleach upon brief exposure to the sunlight. The dyer is in no wise responsible for this trouble. He occupies today a very difficult position. He is required to color the goods quickly, to have the colors uniform and as fast as possible. Moreover the cost must be low and the shades match the sample.

The demand for low priced goods is the cause for much of the trouble with fugitive colors. The trade requires attractive and durable fabrics for very little money. In order to remain solvent the manufacturer is obliged to exercise every possible economy in raw material and its manufacture. Fast colors can still be obtained by the use of indigo, dye woods and iron colors. The demand for these colors is, however, very small. They have been displaced by aniline, methyl and alizarine colors and as a consequence the dyer of today has very little opportunity to learn how to color them. I believe that the use of indigo will revive in spite of its neglect at present. As far as fastness is concerned indigo stands at the head of the list, and the discovery of artificial indigo has done much to restore this dye to its former supremacy.

(To be continued.)

The leaves of the Norway pine yield a fibrous substance which is spun into yarn and used for knitted garments for persons troubled with rheumatism.

PERSONAL MANAGEMENT OF A MILL.

How often should a mill manager personally inspect the departments of his mill? Every manager and superintendent has asked himself this question. The answer depends upon many circumstances such as the size of the mill, the class of work being done, the temperament of the manager or superintendent, the character of the help, and the nature of the supervision required. In a two or three set woolen yarn mill, in which the manager is also boss carder and spinner, the work is likely to go wrong if he leaves the mill. It is then a question, not of how often he should visit the workrooms, but of how often he can leave them to visit the office.

In one of our largest mills on fancy goods, with buildings covering an area of many acres, with vast quantities of material being converted into an immense number of fabrics, the conditions facing the manager are radically different. It is now a question of how often he can leave the office for the workrooms. If he attempts to patrol the mill frequently to inspect the work, his office work will soon be in confusion. On the other hand he can easily fall into the opposite error, and apply himself to office details to the neglect of a personal inspection of the machinery, material and help. Even if he plans to divide his attention judiciously between the mill and the office, he finds these plans thrown awry by the necessity of frequent communication between office and workroom, whether he is in the office or the mill.

For example, in the office he starts to calculate the cost of a fabric made from a new lot of wool, and finds that the dyer has not reported the result of the test for shrinkage. Before he can proceed with the calculation he must either send a messenger or go himself to the dyehouse, perhaps an eighth of a mile distant, to get the report. Again, he is laying out a new fabric and wants to see yarn that has just been spun for it. Another trip to the spinning room, this time across the mill-yard and up three flights of stairs. Another time he is preparing directions for finishing a fabric and wants to know how long and how heavy the pieces are coming from the loom. This time it is a trip to the weave room and

a search for the overseer among the looms. After wandering aimlessly among the looms some one tells him the boss is in the spinning room. The superintendent impatiently waits while a messenger brings the overseer who supplies the information desired. Returning to the office the directions for finishing the fabric are completed. Valuable time is thus wasted, the day ends and the superintendent has become physically and mentally exhausted, while many important matters have received no attention.

On such visits as these to the workrooms the manager cannot give his calm attention to the general work of the mill because it is then fastened on the object of his errand. His time is thus consumed in unprofitable and exhaustive exertion. A messenger boy generally proves to be a very poor remedy. The practice of calling the overseers to the office is unsatisfactory; they are frequently unable to supply the information wanted without going back to the mill, and this traveling back and forth is as unprofitable for them as it is for the manager.

A solution of this difficulty in managing mills is found in the quick and reliable means of communication afforded by the telephone. This great modern invention has become a necessity in communicating between different parts of towns, cities or the country. Owing to the patent rights, the application to individual mills and workshops and large institutions has been of slower growth. It is only within a few years that the perfected invention became public property to such an extent as to allow such use. Even now a natural conservatism and the mistaken idea that people under the same roof need no artificial means of communication prevent many firms from utilizing this great labor saver.

Telephone systems are now installed in isolated establishments to work with quickness and accuracy. There are no annoying delays owing to a failure of the apparatus to connect. They enable the manager to speak to any overseer or workman in the mill as easily as if all were in the same room. The system is adapted for both small and large mills and the cost is so low that it is rapidly displacing the old speaking tube. It is a necessity for communities and is rapidly becoming indispensable for individual manufacturers.

TEXTILE CONDITIONS IN ENGLAND.

BY S. B. H.

(Specially written for The Textile World Record.)

POLITICS.

Since I last wrote there has been no development in textile circles that calls for any special notice, the only item of moment being the great stir over our fiscal policy. As yet it has got no further than the talking stage, and I don't expect it will get much "forrarder" until there is a general election, and Chamberlain's policy settled at the polls. It is my candid opinion that if textile Lancashire and Yorkshire had the thing to settle between them they would decide emphatically to continue as we are, our Free Trade policy having done much to bring this country up to its present standing. True, the sale of textiles manufactured on the Continent has increased during the last few years, but then in the aggregate our exports to Germany are all round $60,000,000 per annum against an import from that country of $20,000,000 worth of goods, so on the whole we are the better off to the tune of $40,000,000.

During the last twenty years the aggregate exports of this country have risen $450,000,000 per annum, so after all we have not done so very badly in face of hostile tariffs. We might do a good deal better if we had no such tariffs to fight against as the Dingley law, and I suppose it is Chamberlain's idea to favor those who favor us, and to retaliate against those countries who are striking heavy blows against British manufacturers, by not allowing them to enter their markets. However, we shall see how matters turn, but I cannot yet see anything less than a free breakfast table for British subjects, and a continuance of the policy which has prevailed so long. I am certain that the huge manufacturing districts of both Yorkshire and Lancashire could never have been built up if they had not had placed at their mill doors raw material untrammeled by import duties, and the general opinion prevails, in the Bradford district especially, that Australia in particular will not give us a great deal of preference, if any, over the Continent, seeing that both France and Germany buy

practically as much wool as do English users.

In my opinion the greatest blessing that could accrue to both Lancashire and Yorkshire would be a settling of the Dingley duties, but I suppose that is now impossible. Countries which are not British take in the aggregate larger quantities of manufactured textiles than do British dependencies, and I hardly think that the working men of this country will as yet throw overboard a tried fiscal policy for one that is untried.

WOOL QUIETER.

Looking more specifically at the wool trade, it is not too much to say that since the close of the London series trade has been rather quieter, but the reason for this is not far to seek. Merinos are no better, and in the case of crossbreds, spinners bought so heavily in fear of prices further advancing that today being so bunged-up they naturally cannot, or else do not feel disposed to buy more. This week we have actually heard it stated that crossbreds can be bought for less money, but that I question very much. It simply amounts to this, that if men are going to be forced to buy by the persistent entreaties of top makers they are going to have tops a cent cheaper than what they last paid, and there the thing rests. I have not heard tell of any transactions with the exception of one or two small lots, and this cannot possibly weaken the strength of the crossbred situation. So far consumption is fully maintained, spinners are in a fairly comfortable position, and with stocks being in a very comfortable position nobody seems to fear much variation from the present high standing of the article. With merinos there is much to be desired, and here matters are a little ticklish. A man today can operate and buy a real excellent super 60's combing at 49c., but cable news to hand respecting the opening of the sales in Adelaide and Sydney state that a super 60's combing will cost 52c.; 64's, 54c.; and 70's, 56c. These are prices altogether outside the latitude of market values here, and either Australia will have to go down or Bradford go up before much business will be done in fine wools.

The manufacturing situation is very far from brilliant, and manufacturers would doubly welcome an accession of orders. To my mind the fact of a big strike being on among the factory workers of Roubaix is by no means a too pleasant omen of the future, but this should more or less benefit the Bradford trade. Whether that be so or no, there is a decided flatness in manufacturing circles, and it is only a favored few who are at all busy. In outside woolen districts work is

more plentiful, machinery is fairly well run, this no doubt being produced by fashions favoring more particular mixture tweeds both for men and women's wear. Covert coating manufacturers are busy with rainproofs ranging from 60c. upwards, and Huddersfield low tweed makers are also fairly well off for work. Generally speaking we can do with a fillip, just to brighten things up a bit.

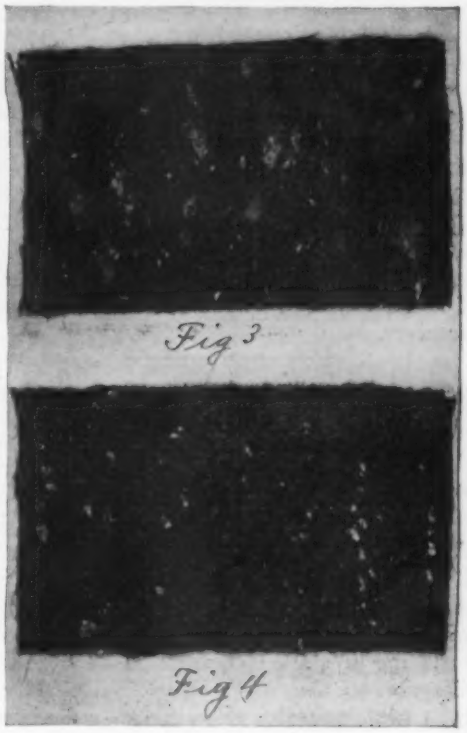
NEW PATTERNS.

As every reader knows, the present styles are all running on "flaked" fabrics, and cloths which show uneven surfaces, these all

being produced by yarn effects. Being educated at the Yorkshire College, Leeds, I naturally attended the opening lecture at which Professor Beaumont gave his introductory lecture to past and present students. His subject was "Effects in woven fabrics due to fancy yarns." In his own lucid and practical manner the professor discoursed very largely on the subject, pointing out that in recent seasons increasing attention had been given by both manufacturer and spinner to the nature of yarn construction in imparting newness of effect to the woven fabric. Fashion, trade transitions, and stress of competition necessitated the devising of ways and means for giving to the yarn novelty of structure. The task imposed upon the spinners was no light one. The primary object in spinning was to form a separate thread—one uniform in density, elasticity, strength and diameter. On a slender, round, continuous body composed of untold numbers of single hairs, he had first to obtain perfection of structure, and second, beauty and freshness of surface. After describing the several methods by which novelty of thread was rendered possible, Professor Beaumont said that study of style in textiles showed that there were periodic revivals of woven effects composed of what were termed "erratic" yarn structures. Examples were given from old and modern fabrics, showing that the introduction of these fancy yarn effects completely altered the appearance of the cloth, when only a common ordinary twill weave was employed.

Professor Beaumont told the students that if there was one branch in woven fabrics in which more progress had been made in recent years than in any other, it was in the science of applying color, for which fancy yarns were specially adapted, as much care and judgment and technical skill being bestowed by the textile designer on the grouping of fancy yarns as the artist exercised in the mixing and application of his colors. One of the many lessons to be learned from the subject was that, while in actual practice there were many divisions or departments in manufacturing, yet, if there were to be perfectness and efficiency of experimental work, it must be under the initiation and control of the mind which perceived the effects and processes prior and subsequent to weaving.

A lecture nowadays is incomplete unless we have thrown on the screen some notable examples of what the speaker is driving at, and Professor Beaumont gave us many of these. Some of the cloths were very old and some new, but I have got together a few of the very latest examples by which the points of the lecture were illustrated. In the case of the men's wear cloth (Pat. 1) we have a



cheap Huddersfield tweed which is not without its redeeming features, and were it minus the "spot" effects it would be a very weak unattractive, unsalable cloth. This can be bought today all round 48c. per yard, 6/4, and it is a leading cloth for the next spring season. Readers will see from the illustration where the "spot" effects are introduced, and as this is produced by the introduction of a thick grey whitish yarn, it not only looks very well, but also is the leading feature in helping its sale. Pattern 2 is somewhat quieter in effect, and all the ornamentation here is due to the introduction of a cotton

twist yarn. The price is only 42c., and the goods look well in the piece.

Patterns 3 and 4 are styles of ladies' dress goods, of which there are a large number on the market. The prices at which they are being made is the great marvel to me, but then Bradford manufacturers can do marvelous things, and are doing them today. Nearly every one of these patterns are for next season, and it just shows what men are able to do on this head. The essential features of every cloth require studying when they come to be finished, some requiring to be clean cut, while others want slight raising by which the spot will present a long drawn-out slub on the face. All these fabrics are examples of the designer's skill in this respect, and show what is being done. A careful intermingling of colors gives tone and taste to a cloth, where a plain fabric would fall flat and be cast on one side. I recommend the subject of this question to United States cloth manufacturers.

THE SIZE OF SINGLE AND PLY YARN.

BY BENEDICT HEIM.

(Translated from Leipziger Monatschrift fuer Textil-Industrie.)

Single as well as ply yarn can be twisted in either one of two directions, right or left. The ply yarn may be twisted in the same or in the opposite direction to that of the single yarn of which it is composed, but in most cases the ply yarn is twisted in the opposite direction to that of the single yarn. If we twist two single threads in the same direction as the single strands are twisted, the ply yarn becomes brittle and shrinks in length. From two hanks (840 yards) of 32s doubled with 18 turns per inch, we will obtain but 720 yards of 2-ply yarn. If, however, these two hanks are twisted in the opposite direction to that in which the single yarn was twisted when spun, we obtain 855 yards of 2-ply yarn.

The shrinkage of yarn under the first named conditions is well known; the increase in length, however, is seldom taken into account, although both are very important factors in manufacturing. In the above example there is an increase of 15 yards in the length of the hank when two hanks of 32s are twisted with 18 turns per inch. The cause for this increase is that a slack twist of 18 turns per inch not only does not reduce, but in fact increases the length of the yarn when the single yarn and ply yarn are twisted in different directions. This increase in the length of the single thread takes place in all cases where the twist is reversed when twisting the ply yarn, but overcome by the twisting of the two threads around each other when the number of turns is increased sufficiently.

The normal twist, that is to say, the twist by which the 2-ply thread is just one-half the combined length of the two single threads, is 24 turns per English inch for 2/32's. It is evident that the exact length cannot be determined exactly for each kind of yarn on account of the many conditions that affect the increase or decrease in length by twisting. This change in length depends upon the kind of material and twist in the single yarn, whether the yarn has been twisted from cops or has been previously spooled, whether the yarn has been steamed, etc. The weight of the traveler and the speed of the spindles as well as the temperature of the spinning room also have their effect.

I have made experiments with yarn of different counts made from the same material and twisted under the same conditions to determine the change in length by twisting. The results are shown in the following table:

	Turns per inch.												
No.	8	10	12	14	16	18	20	22	24	26	28	30	
12	840	832	825	817	810	800	790						Yard
14	843	838	833	824	815	806	798	773					"
16	848	843	838	831	823	816	809	787	772				"
18	856	850	843	836	830	822	814	805	796	763			"
20	862	855	848	841	835	833	828	822	816	786	761		"
22	863	858	852	846	840	837	835	829	823	800	775	752	"
24	862	860	856	852	846	840	837	832	829	809	790	769	"
26	863	862	859	856	850	846	840	836	831	816	802	788	"
28	864	863	861	858	856	849	843	840	836	824	812	801	"
30	865	864	862	860	857	852	847	843	839	831	822	813	"
32	866	865	863	861	859	855	850	845	841	835	830	826	"
34		866	864	862	860	857	853	848	844	840	836	832	"
36			865	863	861	859	855	849	846	843	840	837	"
38				864	862	860	857	853	849	845	842	839	"
40					863	861	858	854	850	846	843	840	"

The numbers at the left of the table indicate the size of the single yarn; those at the top of the columns, the number of turns per

inch in the 2-ply yarn. The yarn was made from first quality American of 1 1/4 inch staple and spun on a ring frame. The number of turns of twist in the single yarn was equal to 4 times the square root of the count. For example, in No. 20 yarn there were $4 \times 4.47 = 17.8$ turns per inch. The yarn was spooled for twisting and twisted dry.

According to this table two hanks of 24's doubled with 10 turns per inch will measure 860 yards when twisted. This represents an increase of 2 4/10 per cent. The consequence is that 840 yards of the twisted yarn is 2 4/10 per cent. lighter than 1,680 yards of the single yarn. It will be necessary to spin the single yarn to 29's in order to have the 2-ply equal to 15's (2/30) yarn with 10 turns per inch.

On the other hand, if 2/30's yarn is doubled with a hard twist of 30 turns per inch, 1,680 yards of the single yarn measures but 813 yards when doubled, a loss of 813 yards per hank or 3 21/100 per cent. If a 2400 end warp 900 yards long is made from this yarn the calculated weight will be as follows:

$(900 \times 2400) \div (840 \times 15) = 171.4$ lbs. The actual weight, however, will be 176.9 pounds, a difference of 5 1/2 pounds on 900 yards of warp.

If the single yarn is spun finer, in this case to 31's, in order to obtain a 2-ply yarn of the required size, several other difficulties arise. First, the higher count involves a higher cost of production because no spinner can spin 31's at the same price as 30's. Again the 31's when twisted will not be as strong as the 30's yarn. This gives the buyer an opportunity to make a claim on account of deficient strength.

Turning to the table we find that its use is very simple. Take, for example, a 2/30's to be twisted with 12 turns per inch. The table shows that two hanks of 30's will measure 862 yards when doubled wth 12 turns per inch. The increase in length is 22 yards and the yarn will be 2 6/10 per cent. too light.

Although nearly every spinner is aware of the change of length during the twisting of ply yarn yet very little has appeared on this subject in technical literature, and I think it is a question that should be investigated for the benefit of the trade.

CUBAN COTTON.

The Western Railway of Cuba recently employed a cotton expert to examine the land conditions in Cuba and report as to their suitability for the raising of cotton. This report has recently been published by the Department of Commerce and Labor at Washington and is as follows:

After extensive examination of the farm lands in Pinar del Rio, which you commissioned me to inspect and report upon as to their adaptability and value for Sea Island cotton raising, I beg to say that I consider the soil extremely well suited to the purpose, being of a rich, sandy loam, well watered and lying nicely.

Part of the land is under cultivation with tobacco and part with sugar cane. Several hundred acres are woodlands, with abundant timber for building purposes and fuel. but the greater portion of the tract appears to be recently cleared virgin soil of great fertility.

I would estimate that there is timber and fuel in sight for many years' supply.

I found cotton growing wild in the woods, without any cultivation, rich in block and full of open cotton and grown bolls. These trees appear to range from 1 to 5 years in age. The fruit blooms and forms on the younger plants all seemed to be in perfect growing condition, which is remarkable at this season of the year, and leads me to believe that they would thrive still better and bear still more abundantly in summer.

On my visits to cultivated farms in the island, I have seen Sea Island cotton planted from seed imported from Florida anywhere from 15 days to 4 months old, and in every case the plants appeared healthy. Plants 2 weeks old were from 6 to 7 inches high; those 4 months old were from 4 to 6 feet in height, the latter weighed down with all the fruit the stalks could hold, from grown bolls to small forms, averaging 80 bolls and forms to the stalk.

With such a yield from a plant only 4 months old, I hesitate to estimate what the crop would be from a 12-months-old tree, as the rapid increase in the size of the stalk would cause it to bear much more fruit toward the latter part of the year.

I should make a conservative estimate at 500 mature bolls per tree for the first year and should judge that every crop will be better until after the third or fourth year.

This would give a result of 4 pounds of seed cotton to the stalk in a year's growth, or about 3,000 pounds of seed cotton to the acre, which would net at least two 500-pound bales of lint cotton per acre.

The plants all appear to bear full and do not shed the young bolls as they do in Georgia and Florida.

The staple is fine and silky and longer than the average Sea Island cotton in the United States. The staple furthermore appears to me as strong as any of our finer class of cottons, and I believe would gain additionally in strength with the employment of a high-grade fertilizer, as has been the experience in the South.

I consider this variety superior to our East Florida cotton, and would sell cheap at from 18 to 21 cents per pound. I believe that after the third year the plant would grow so that the cotton would get out of reach, but this might be remedied by tapping.

I would recommend breaking ground as early as December, and planting in March, April and May, bedding up the land, planting the seed on the crown of the beds, and allowing furrows between beds to drain off excess moisture during the heavy rains.

I also believe it will be necessary to cultivate and weed the ground frequently, as weeds appear to grow with great rapidity and thickness.

The insects I have noticed in the cotton fields are nothing as compared to what I have seen in Florida. I found our fireworm and caterpillar in the trees, but in numbers they are not worth mentioning. In Florida we kill these insects by sprinkling the bushes with a mixture of 1 tablespoonful of paris green to 1 gallon of corn meal, and I should think the same treatment, or perhaps a liquid solution of the same poison, would exterminate the insects equally well here.

I noticed that the tobacco plants on the island appeared to be attacked by the same insects as our tobacco in Florida, and I should judge the same conditions would apply to cotton.

In a word. I consider conditions in Cuba from every standpoint more favorable to the successful cultivation of cotton than conditions in the cotton belt of the United States, and that with proper preparation of the soil, careful selection of the seed, and frequent cultivation the Sea Island cotton grown in Cuba will be far superior to our best varieties.

The native wild cotton resembles the Egyptian variety in texture and has a clean, black seed, with a staple somewhat longer than our best uplands, but I would recommend the exclusive growing of Sea Island cotton on your plantations, as the conditions of the soil there appear to me favorable to the successful raising of the choicest variety of long-staple cotton.

The only tapestry factory in the United States is at Williamsburg, New York.

MEMOIRS OF A VETERAN MASTER MECHANIC.

BY EBEN GOULD.

(Continued fromOctober.)

I stayed with Mr. Paul till March 1873, then went to the Merchants Woolen Mills to work for Mr. Grinderfine, Mr. Strong still being the agent. Sometime before leaving the mill I had noticed that the key that fastened the crosshead to the piston rod of the beam engine would work loose and the engine would have to be stopped to tighten the keys. The engine was pretty old and the keyways somewhat worn and to avoid any chance of an accident by the keys flying out I took them out and drilled a hole through the small end in which I put a set screw which prevented their flying out and causing a smashup. These screws were there for a long time but after I left, the foreman that took my place had occasion to disconnect the piston rod to do some little job, and when he was ready to replace it he told the machinist to leave out the screws and said it was only one of my old maid whims. The screws were left out and a few days later the keys flew out, the piston disconnected from the walking beam, the cyliner head was knocked out, the piston smashed, the walking beam broken and the frame as well as the crank broken; all that was left whole was the shaft and the balance wheel. After that smashup the boss machinist was convinced that there was something in my old maid whims.

The day I went back the agent had so many things for me to attend to that I did not have time to go to the picker house engine until it was time to shut down at night, then I was scared for the engine was pounding at a great rate with every indication of the piston rod being loose. I asked the man in attendance what was the matter with his machine and he said he didn't know, it had been going bad for some days and grew worse every day. I told him to shut down for I wanted to report to the agent before he left the mill. Then I went to the office and told Mr. Storrs that he was very near another smashup in the picker house engine, but I would look it over and he could see it in the morning, but I was

sure it would need another head before it could be started again.

Now this piston rod had been connected by a thread being cut in the cross head and a corresponding one on the piston rod so that the rod could be screwed into it and then set tight by a large check nut on the rod. The check nut had worked loose and that caused a motion, and the continual working of it made it grow looser till all the threads in the craphead had been broken, and it would slip on and off the rod without turning. If it had come apart before shutting down it would have made a wreck of the whole machine.

When I went back to the mill I found only two of the old hands at work who were there when I was there before. All the engineers and firemen had been changed for new men as well as the mode of firing. On looking into the fires I found every one had the coal piled on so thick that it was almost impossible to see the boilers, and the amount of coal used was very much more than the actual need. After getting the picker house started my next move was to change the mode of heavy firing so as to have thin fires and a large amount of steam with less work for the firemen. One of the men said he had rather leave than try to run my boilers with thin fires. It took about three weeks to get the men to run the boilers to suit me, but then they all owned up that the work was not near so hard as it was with the old way of heavy fires. I told them to always keep the fires clean and even and six inches thick and the steam would never get low, and after this there was never any throwing off of the heavy machinery so the firemen could get up steam.

Once, when talking with Mr. Wellandstrong, I had occasion to speak of Mr. Shobob, and he replied that he did not want anything to do with him or his. "Well," I said, "Mr. Shobob has something that you would give every dollar you are worth to possess, and then you would be worth more in a year than you are now."

He wanted to know what it was, and I told him it was skill in mixing different kinds of material together and bringing them out into salable goods, for he could do that better than any super or agent I ever saw. I had been in his mill and knew something of his work.

In 1875 Mr. Wellandstrong left to go to the Stone mill and John Ballyhack took his place as agent with Tom Crewso as super. One day Mr. Ballyhack called me to the office and showed me a drawing of a machine that he called a crabbing machine. He told me what it was for and the effect it had on the goods, and asked if I could make a machine with a similar effect at less expense. I told him I thought I could make a wooden frame machine that would not cost much and would do the work just as well as the large machine. This machine had a large iron frame standing about 8 feet high with a number of iron rails. The getting up the patterns and making the machine would have cost several thousand dollars, and Mr. Ballyhack did not want to go to so much expense. Not seeing the need of so many rails and cylinders I made a wooden frame and two 20-inch cylinders with a small top roll and a small dyeing tank. When it was all set up in the dyehouse and ready to start the boss dyer called Mr. Ballyhack to see it and he pronounced it altogether too small. I asked them to put in some pieces and see what it would do; so they did and pretty soon Mr. Ballyhack called me and said the crabber worked fine and would do a piece quicker than the large machine. He was so well pleased with it that he sent to the mill where the large iron machine was in use to have several of the men there come over and look at his little $50 crabbing machine.

A short time before I left Mr. Paul to go back to the Alteisen Woolen Company, E. D. Buckley, who was running a boiler and machine shop on Tremont Street, a short distance from Chickering's piano factory, came to see me about going as referee on a case where there was some misunderstanding in regard to the repairing of an engine by Mr. Buckley. The engine was owned by a party that furnished power to several small shops of different kinds in the South End. The owner had been bothered for some time by the engine not being able to keep up speed. Her engineer said the cylinder was worn and needed boring out and a new piston, which the owner hired Mr. Buckley to do.

When the repairs were made it was found that the engine was still unable to keep up speed when the machinery was all on and the owner refused to pay the bill.

At last it was agreed that each of them should choose one man and they should decide whether the work had been properly done; if it was all right the bill was to be paid, but if not it was to remain unpaid. We went to the place one Saturday after the works were stopped, and the other referee, the owner, the engineer and I gave the machine a thorough examination and we agreed that it was no fault of the engine that the power was short. I had an idea where the trouble lay and calling the engineer to one side asked him to show me the coal pile. He did not seem inclined to do so, but I told him I should ask the owner if he didn't. He then took me into the boiler room and showed me a small coal pile. I gave it a look and found what I expected, for a poorer mess of rubbish I never saw that was called coal. I looked at the engineer and asked him how much he was paid for burning that stuff. I said:

"You needn't deny that you are receiving 'graft' money from the coal dealer that brings you that stuff. You have taken money from them and you don't dare find fault with the coal for fear the dealers will blow on you, so you lay the blame on the engine. Now I am not going to give you away to the boss, but I'm going to make a proposal to him which if he accepts will settle the business. If he doesn't, then he will have to pay the repair bill."

We then went back to the engine room and I told the owner that I would like to furnish a man to run the engine and all the coal for one or two weeks, that I would keep the engine up to its full capacity and occasionally blow off steam. If I failed to do it, it would cost him nothing for coal, engineer or Mr. Buckley's bill, but if I did accomplish it he should pay for them all. Mr. Buckley said he would stand by what I had said, but the owner said he wouldn't have any such thing, that his engineer was a good one and he would believe him before anyone else, and he said the fault was in the engine. I told him I was glad to find one man that would stand by his own men and with that Mr. Buckley and I left. When we were out in the street I told him about the coal and that the owner would soon find out about the coal and then it would be good-by to the engineer. Only a few weeks later I found that Mr. Buckley's bill was paid and a new engineer was at the South End plant. It seems that the owner went over to East Boston and got a fireman that he was acquainted with to come over and look at the engine. He reported that the engine was all right, but he also reported on the coal and in all probability exposed the engineer, which was the cause of the change in men.

I found while at work in the city that it is quite a common practice for drummers to pay graft to engineers or others with whom they can trade and in the end it would be the means of their discharge. It is a bad practice; better be contented with your day's pay for sure as you accept graft you will have to take poor coal or other material. I knew one young man who had a good situation, I warned him against taking money from dealers, but he could not resist the temptation. At the end of the first month when the bills came in he was taken to task by the owners and warned not to do the like again, but he had already traded so much that at the end of the second month he was discharged without notice with no prospect of getting another job. Unless you want miserable stock sent you never take graft from a trader or agent.

(To be continued.)

The number of processes which a kid glove undergoes, beginning with the raw skin and until it reaches the consumer, are numbered by the score. A single skin is said to pass through no less than 200 hands in the process of manufacture.

The plant from which hemp is made is a species of wild plantain or banana, native to the Philippines, called abaca. They grow to a height of twenty or thirty feet and when three years old are in the best condition for yielding fibre.

A SELF-CENTERING SPINDLE.

Textile manufacturers will be much interested in the new spindle which has recently been patented by Samuel F. Carpenter, Pawtucket, R. I. It is claimed it can be run at a high rate of speed with practically no vibration. As described by the inventor it consists, first, of a bolster mounted upon a collar in the upper part of the bolster-case; second, of a tapering step whose smaller end rests upon the bottom of the bolster-case and its larger end in contact with the circular bore of the same, and, third, of a locking device for the bolster and a locking device for the step whereby each is restrained from rotation, while otherwise there is liberty of movement necessary for the perfect operation of the spindle.

Figure 1 is a view, partly in section and partly in elevation, of the new spindle; Fig. 2 is an elevation view of the bolster; Fig. 3 is an elevation view of the step-support for the spindle; Fig. 4 is a cross-section as seen in line, X X, of Fig. 1.

A is a bolster-case interiorly of a larger diameter from the shoulder, f, upward. The bolster-case, A, is provided with locking-pins, a, and a'.

B is a step-support for the spindle, C, whose pintle occupies a socket in the top of the step, B. The step, B, is in the shape of a frustum of a cone whose smaller end rests upon the bottom of the bolster-case and whose lateral contact with the wall of the bolster-case is at the perimeter of its upper end. The cavity in the upper part of the step, B, has a larger diameter than the pintle, c, of the spindle, or preferably the cavity may be made tapering, as shown in Fig. 1. In either instance the step, B, will have freedom to move when acted upon by the spindle.

In the operation of the spindle, C, the step, B, is acted upon as a lever of the third class, the power being at (c), the fulcrum at (d), and the resistance at (b), on which account the action of the spindle, C, upon the step, B, being at mechanical disadvantage insures against extreme sensitiveness of the spindle to varying conditions attending its operation, while it has sufficient freedom of foot movement for any adjustment necessary to its perfect operation.

D is a bolster mounted within the bolster-case, A, upon a collar, e, which rests upon the shoulder, f, of the bolster-case interior. A cross-sectional view of the collar, e, is shown in Fig. 4, (e') being a slot in the same to permit the collar to pass the locking-pin, a, when being placed in the bolster-case upon the shoulder, f. The collar, e, has an interior diameter sufficient for the spindle to

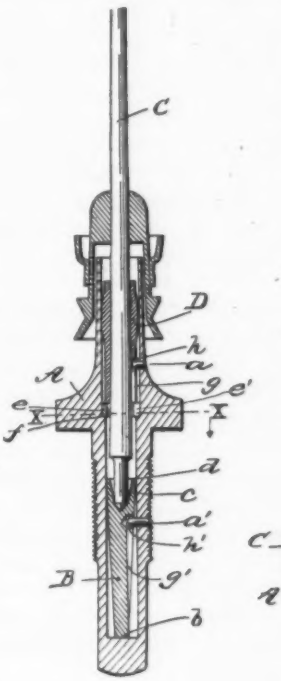


Fig. 1.

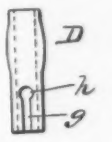


Fig. 2.

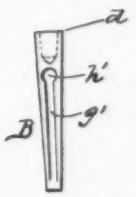


Fig. 3.

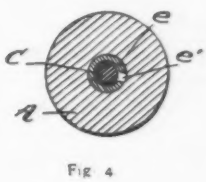


Fig. 4.

pass through without contact therewith. The bolster, D, is adapted to tip when acted upon by the spindle, C, its lower end having liberty of lateral movement upon the collar, e. For this purpose the bolster has a convex annular enlargement near its upper end which is in contact with the bore of the bolster-case, and the portion of the bolster which is below said enlargement is of a diameter less than the diameter of the bore of the bolster-case, so that the bolster is capable of an oscillating movement. The bolster, D, and the step, B, are mechanically

distinct and independent in their operation, while both contribute, each in its way, to the perfect operation of the spindle. The bolster, D, and the step, B, are provided with an improved locking device.

In locking devices heretofore in use the locking-pin has engaged the bolster or the step in a narrow and shallow channel, which device, while it restrains from rotation, is liable otherwise to injuriously restrict the movement of the bolster or of the step.

In the new device the locking-channel, g or g', terminates in a circular cavity or ward, h or h', deeper and of a diameter greater than the width of said channel. The locking-slot is made into an entering channel or guide which leads to the locking-ward, h or h', in which the locking-pin, a or a', can have contact with the bolster, A, or the step, B, at the place only where it restrains from rotation. Consequently it can restrict the movement of the bolster or of the step in no other way.

In the large upper end of the step, B, is a conical socket to serve as the seat of the conical pintle of the spindle, but of a diameter exceeding the diameter of said pintle, thus enabling the spindle to gyrate into seat.

The collar e may be dispensed with without in any manner changing the mechanical principle involved in the invention, and if it is omitted the lower end of the bolster will then rest upon the shoulder, f, directly and be laterally movable on it.

COATING THREADS OF FABRICS WITH METAL.

The old process of winding metal round some core of cotton has never given entire satisfaction, so that a new process which has recently been invented will interest all who are connected with the fancy trade. The essential feature of the process is that the material to be treated is impregnated with suitable bronze powder or undissolved powdered pigment, the impregnating bath being supplied with an adhesive substance, such as agar-agar, isinglass, gelatine, glue, caoutchouc, gutta-percha, resin, or colloidal substances, in order to produce an intimate connection between the fibre material and the bronze or pigment. Vegetable mucilage, such as bassorin and albuminoids is also well adapted to the purpose.

The manner in which the method is performed in detail mainly depends on the use to which the finished product is to be put. In some cases it is sufficient to conduct the material to be treated through a dilute or saturated solution of caoutchouc in benzine, tetrachloride of carbon, ether, sulphuret of carbon, or a mixture of, for instance, 92 parts sulphuret of carbon and 8 parts absolute alcohol, or any solution of agar-agar, gelatine, glue, starch, or the like. Particularly suitable for this impregnating liquid are all colloidal substances and their solvents. The saturated material is then drawn through powdered coloring matter or bronze. Of colors, the azo and azoxyaniline colors are particularly adapted to produce the metallically-glittering coating.

After drying in the air or in a suitable drying apparatus the color or bronze adheres very firmly to the core filament or fabric. In order to render the coating as unsensitive as possible to external influences, and more particularly to protect it during the subsequent working of the material, the latter, treated as described, can be finally drawn through a solution of celluloid in acetone with amyle acetate or through a collodion solution, which may contain bronze or pigment powder in suspension. Finally, if the impregnating liquid is of a gelatinous character, a hardening agent may be used in the process, such as, for instance, liquid or evaporated formaldehyde or bichromate of potash. Of course, the pigment of bronze powder can also be added to the adhesive matter at once, and the impregnation when effected in a single bath.—Textile Manufacturer.

The Dacca muslin, sometimes called the "woven wind of India" is the most perfect specimen of a cotton fabric that can be found. The implements used by the Hindoos in its manufacture are of the rudest construction. The cotton fibre is separated from the seed by the use of a bow of bamboo strung with rawhide; it is carded with the bone of a fish; twisted into thread by the use of the distaff, and woven on a primitive loom made of bamboo reeds.

THE USE OF OIL HOLE COVERS AND CUPS ON TEXTILE MACHINERY.

There are several devices on the market designed to protect the bearings of machinery from foreign matter.

Oil holes are essential in any piece of mechanism which has a bearing needing lubrication, and the holes should be equipped with a dust proof and oil tight cover. Oil-hole covers not only prevent the holes from becoming clogged, but they locate the holes for the operator, conduct the oil to the bearings and add to the neatness and cleanliness of the machine, operator and product.

For loose pulleys the oil tight cover holds the oil from being thrown out when the pullye is in motion, abolishes the yellow streak on the ceiling and floor, and eliminates any possible chance of the goods becoming soiled with the oil.

The purchasers of textile machinery of any description which have oil holes leading to a bearing, should have embodied in specifications for new equipment a provision that machines be furnished with the best devices that are on the market in the line of oil-hole covers, as these covers without doubt add to the wearing life of the machines, cut down repair expenses, and save enough oil in one year to more than cover the additional cost. Oil-hole covers should be attached when a machine is in process of construction, or when a machine has been knocked down for repairs.

It would be to the interest of manufacturers of textile machinery to use a dust-proof device for all bearings on their product, and for the mill owners to equip the machines now in their factory. There are plenty of places left for a machine to wear out, to be replaced with a new machine or part thereof, and the last place to go should be a worn out bearing, from the want of proper lubrication and protection from dust, lint and grit.

The process of mercerizing was invented in 1851 by John Mercer, a cotton printer in Lancashire, England, who was experimenting in the hope of finding a process that would shrink and toughen the fibres in a manner similar to the fulling of woolens.

BOBBIN FILLING: ITS TENDENCY TO KINK.

Abstract of a paper read before the New England Cotton Manufacturers' Association by John Gregson, Fiskdale, Mass.

When filling was spun by the distaff and spindle, as was the custom a little over 100 years ago, our grandmothers, who turned the wheel and handled the distaff, knew just how much twist to give the yarn to make it strong and durable. When weaving left the hand-looms, and steam power looms took their places, a greater amount of yarn was required than could possibly be produced by the distaff and spindle. At this time James Hargraves of Blackburn, England, invented the spinning jenny, from which 16 or more threads could be spun at one time. At the same time a humble barber, Richard Arkwright, in a town some ten miles west of Blackburn, was busily engaged in developing the important series of inventions and adaptations, which resulted in the modern throstle spinning frame. Arkwright's principal patents were secured in 1775, and in that year, Samuel Crompton of Bolton brought before the world his mule spinning frame, in which the drawing rollers of Arkwright were, with happy effect, applied to the spinning jenny of Hargraves. This machine has been improved and perfected, until as we see it today, each mule spins 1,200 or 1,500 threads at one time.

But in introducing machinery to take the place of one, who knew by intuition the amount of twist required for the yarn, we ran against another obstacle which has given us considerable trouble, and that was the tendency of the yarn from the filling mule to snarl or kink. I remember when a boy, the system adopted at some mills; after the filling was spun, and doffed in large boxes, or baskets, they were placed in a dark room, on racks, three or four tiers high. The floor was laid with timbers some two inches apart. Below the floor, some 12 inches deep, was water running day and night. The filling was left in the room for some three days, when it was carried to the weave room to be used. The time that the filling had remained in this dark room had so set the twist, that when the filling was used, each strand was perfectly straight, there being no tendency to kink or

snarl. But in mills of 1,000 looms or over, too much space was required for this ageing process, and something more rapid was demanded. At this time the process of steaming the filling, to enable the weaver to use the yarn in a few hours after being spun was adopted, and I think most all mills have adopted this system.

Some 30 years ago, some mills more progressive than others began to spin filling on a spinning frame. It was considered cheaper and of better quality than filling spun on a mule. There was not much trouble in the weave room with the filling produced, 5,000 or 6,000 revolutions of the spindle was all that was obtained, but when the Draper Co. had improved the system of spinning, and introduced the Sawyer, and afterwards the Rabbeth spindles, revolving some 1,100 or 1,200 revolutions a minute, then trouble began. Many and many a time I have seen bobbin filling carried to the weave room, that was a trifle heavier than the number called for, but containing the same number of turns of twist, as demanded by a finer thread. When the cloth was woven it was more like a Turkish towel, than a piece of print cloth or sheeting. Second quality cloth would rush up tremendously, indeed I have seen every piece woven thrown out for second quality. Various systems have been tried to overcome this difficulty. In some mills a hose pipe is used, and water allowed to run on the filling; others will take a watering can and sprinkle the filling; others will place the filling in boxes or baskets in the mill yard for a few hours, expecting the atmosphere to develop a filling that will not kink or snarl. But none of these systems are absolutely perfect. Using water on the bobbins will ruin them; in a few weeks they have to be reamed out to fit the spindle, many being broken in the operation. Another trouble which is of vital importance on fine goods is the filling being wet on the outside layers alone which causes a greater contraction of the cloth, the cloth woven from the rest of the bobbin, two-thirds of the amount of the yarn being almost dry, will be wider on account of the filling coming from the bobbin easier. Considerable trouble is caused from this irregularity in the width of the cloth.

A system has been adopted and can be installed at a small outlay, whereby all this trouble can be avoided. There is no fear of the filling kinking, and it greatly improves the appearance of the cloth. You no doubt have heard some cloth-brokers say, they can tell by the feel of the cloth whether it has been woven with mule or bobbin filling; and there certainly is a difference, so that a man educated to the feel of the cloth, can tell at once the kind of filling used in making the piece of goods. I have known printers to ask for a shipment of cloth and insist on mule filling being used in weaving it. These orders have been filled and cloth woven from bobbin filling has been shipped. After the bobbin filling has been through this process no man could tell the difference from cloth woven with cop or bobbin filling.

The system that has been adopted by some of our Northern mills is, to place the filling in a chamber, in bulk, or in large boxes containing the doffing from a number of frames; the bottom of this chamber is covered with slats, of say one inch wide, leaving one inch of space between them. Underneath this floor is a system of humidifiers, throwing out an atomized spray of water. On the top of the chamber is a pipe say 10 inches in diameter, connected with a fan which draws the moisture through the mass of bobbin filling. The moistened air is again forced in the chamber underneath, and again drawn through the filling. In some two or three hours the filling is ready for the loom, and it is next to impossible to have any kink formed in the filling. The fibres of the yarn, which on bobbin filling are well laid, though having an extra amount of twist spun in the thread, after being through this process become fully as fibrous as mule filling, the cover of the cloth is just as soft and full, as if woven by cop filling.

In cloth that has to be used for cotton flannel, mule filling is invariably preferred, but if bobbin filling has been through this process the nap can be raised and the finish is just as good as cloth made from mule filling.

Some mills where the spinning room is in the upper story, will have a pipe extending from the spinning room to the weave room, or basement, where the chamber may be. The bobbins are thrown down the pipe which

extends to the chamber in which the filling is being prepared, by which means the chamber is always full of yarn. The yarn taken out at the front of the chamber, causes the yarn in the pipe to fall lower, and again fill the box.

This chamber may be divided into sections, so that different numbers of filling can be conditioned.

In my experience I do not know of any other system by which the same amount of filling can be conditioned, or made weavable in so short a time.

THE MIXING ROOM AND ITS RELATION TO THE SUBSEQUENT PROCESSES.

BY J. T. B.

The mixing room of a cotton mill is considered by many to have no particular significance attached to it, so far as taking any actual part in the successful operation of the mill, and, as a result, the help generally employed to take charge of this work is the cheapest and most unskilled class in the mill. The above may apply in a general sense more to Southern than to Northern mills; because in the former it is the exception rather than the rule, to run several varieties and lengths of cotton at the same time, while in the latter this practice is becoming more common; especially in mills manufacturing fine goods.

It is probably owing to the fact that the Southern mills may run from year to year on the same class of work, that the idea of mixing has been treated with so much indifference by many Southern superintendents. When the subject is presented to them their argument is, that mixing is all right when it is necessary to blend cotton of different colors, or where two grades are mixed to produce a thread of a given strength, at a smaller cost than by using the better cotton exclusively; but that, when a mill is using the same class of cotton the year round, they consider it a waste of time, floor space and labor to build a mixing room, and consider it far more economical to open the bales near the automatic feeder and pass the cotton through the pickers as soon as possible.

It is also a fact that some mill men, while holding views similar to the above, are continually asking why they have so much trouble in trying to keep their weights and numbers correct.

That conditions identical to these are constantly confronting us, can be vouched for by many; and this, too, at a time when cotton mixing has been commented on by textile books and periodicals, and endorsed by successful manufacturers everywhere.

It may be true that it is not necessary to employ labor of such a standard, so far as his knowledge of cotton is concerned, in a mill using but one class of cotton, as would be expected in a mill using several varieties, when judging from the standpoint of keeping the various classes separated, and keeping a strict account of the weight, length and grade of all cotton used during each day or week, etc. It is, however, absolutely necessary to employ help that can be relied upon by the superintendent or overseer in either case.

While the subject of mixing is not by any means a new one, it is the object of this article to treat it in such a manner as to throw a direct light upon the question of keeping numbers uniform, which seems to be one of the most vital questions to carders and spinners throughout the industry.

While we agree that mixing may be advantageously employed for blending colors, or when using different classes of cotton to reduce the cost, the above do not constitute entirely the object of the mixing. The following factor must not be ignored; viz., the expansion of the cotton from its matted state, and the evaporation of the excess moisture, before the stock is put into the machines.

I am aware that the expansion will apply more directly to the compressed bale than to the bale as received by Southern manufacturers from the ginnery; also that every bale may not contain excess moisture to any injurious extent, nor even the same per cent. of moisture, under the most favorable conditions. Nevertheless, the gin pressed bale is in a matted condition, and would be benefited very materially by being left loose for two or three days before being put into the machines. There is a great variation at times in the per cent. of moisture in the bales, also a slight variation all the time; and here is found the key to the situation.

For instance, let us imagine ourselves in a picker room such as may be found in many Southern mills, using 10 bales of cotton per day, or about 5,000 lbs. The automatic feeder is connected to the breaker picker, the bales are opened near the feeder, and the cotton fed into the hopper. The first bale is of normal weight and moisture, and after the feed has been regulated to give the required lap, the picker room boss is directed to take back any laps from the finisher picker which vary more than half a pound from the required weight. Another bale is now opened and contains a larger amount of moisture than the preceding one, but it is fed right into the feeder, and as they seldom weigh the laps from the breaker, it passes to the intermediate and finisher with the result that when the first lap from the new bale is weighed there is too much variation in it and the lap is put back. This, however, does not remedy the evil, because the operative will proceed to adjust the evener motion to obtain the required weight, and when this has been done, the picker is allowed to run until the next bale is fed, when it may be necessary to make another change, which may be in the opposite direction.

Some may contend that the above is but a small item in the mill, and it has been necessary to return only one lap which can be made in say 5 minutes. To this we would say that if the return of one lap completely remedied the evil, then it would be a small matter, but when the first lap has been returned, and the right weight obtained on the second lap, we have in that weight a certain per cent. of moisture which will evaporate at the cards or drawframes. A part of what has been passed through the pickers as cotton is really water and will be lost by evaporation, leaving the actual weight below the required standard. Here then is the source of the difficulty of keeping numbers uniform and the extent of the trouble just started is of more consequence than at first imagined.

The following figures will show the magnitude of this, assuming that we follow one lap 50 yds. long, which is of a different weight than the rest, and keep the product of said lap from being mixed with the cotton of correct weight.

In the first place we have the lap placed on the back of the card, with a draft of 100 in this machine. The result is that 5,000 yards of sliver is produced, which, we will assume, is deposited in 6 cans.

The cans are all placed together behind the drawframe, which has a draft of 6; and therefore the length from the drawframes practically remains the same; but in the regular practice it would be more probable that these cans would be mixed with others and thus cause a greater amount of uneven sliver from the finisher drawframe.

We have then the minimum number of cans for the slubber, (6), and each contains 833 1/3 yards of sliver, which is subjected to a draft of 4 1/2 in the slubber, making 3,750 yards of slubbing from each can, or a total of 22,500 yards of slubbing. This is used double on the intermediate, with a draft of 5, making 56,250 yards of intermediate roving. Again we double this behind the roving frame, with a draft of 5 1/2, and obtain 154,687 yards of roving, which we double behind the spinning frame with a draft of 8, making 618,750 yards of yarn. This is one lap only, and if we took but one bale, which would make about 12 laps, we should increase the above to about 7,425,000 yards of yarn.

Is it then any wonder that the carder and spinner complains of continually changing gears in order to keep correct weights, causing a loss of production in addition to uneven work? The above figures may be considered a very conservative estimate of the result of feeding damp cotton, not to mention the injury to machinery, especially the card clothing.

If, however, a space had been provided for a mixing large enough to last about four days, or one week, and the cotton allowed to stand in a loose condition, permitting the air to circulate through it, and drying out any excess moisture, we believe the conditions both as regards production and quality would amply repay the superintendent for the necessary space and help.

The Chinese first made paper of waste silk; the Arabs made it of cotton.

Questions and Answers.

☞ Under this head we undertake to answer, free of charge, to the best of our ability, any pertinent inquiry pertaining to textile matters received from any regular subscriber to the TEXTILE WORLD RECORD. Questions should be stated as briefly and concisely as possible. Inquiries pertaining to textile processes, machinery, improvements, methods of management, the markets, etc., are especially invited, as well as any legitimate discussion on the views expressed. All inquiries must be accompanied by the name of the person inquiring, not for publication, but as an evidence of good faith.

For reply to questions that are not of general interest to readers of textile journals, such as those relating to the composition of yarns, analysis of fabrics, etc., we will charge the enquirer with the cost of the investigation.

Cotton Warp Meltons.

Editor Textile World Record:

For years we have been manufacturing cotton warp meltons, which have acquired a high reputation in the market by reason of the well-covered face. Some time ago the mill in which these goods had been made was destroyed by fire; since then it has been rebuilt and equipped with new machinery throughout. We now find it impossible to make as good meltons in the new mill as in the old; the face looks teethy and our customers decline to accept the goods. The new cloth is made of the same kind of stock, the only change in the manufacture being in the looms on which they are woven. The old looms ran 60 and the new looms 90 picks per minute. Can you suggest a cause for our difficulties? Walnut (352).

To obtain a well-covered face on a melton it is necessary to "burst" the threads in fulling, that is to say, to felt the goods so that the threads will be matted so firmly together as to form practically one solid mass. This is more easily effected when the threads are twisted soft. Much softer filling can be run on a loom running 60 picks than on one running 90 picks per minute, and we should not be surprised if Walnut would find upon investigation that the spinner had found it necessary to twist the filling harder in order to make it weave on the fast running looms. This would prevent the "bursting" of the threads in finishing and would cause the teethy appearance complained of.

Size of Single and Ply Yarn.

Editor Textile World Record:

We are manufacturing cloth made from 2/30's cotton yarn and spin our own yarn. The single yarn is spun to 30's, but I find that the 2-ply yarn is heavier than single 15's (2/30); it varies from 13 1/2 to 14 1/2. I presume this difference is due to the take-up in twisting and should like to know what allowance must be made for this factor. Under present conditions my goods are much heavier than the calculated weight. Two-ply (389).

The difficulty which Two-ply is having is due to the take-up in twisting. It is customary to spin on the light side, single yarn intended for twisting in order to make allowance for the take-up. This take-up however, varies with the number of turns of twist and the size of the yarn, and no fixed rule can be given for it. Under certain conditions the ply yarn comes out lighter instead of heavier than the calculated size. This is the case where there are very few turns in the yarn: the twisting of the ply yarn untwists the single strands and makes the yarn longer.

Very little has been published on this subject although it is interesting and important. In another part of this issue will be found an article by a German writer on the effect of twist on the size of ply yarn.

Cotton Cloth for Cuba.

An inquiry for the addresses of manufacturers of cheesecloth for covering tobacco plantations appeared in our November issue. Besides the address given at that time the following named firms are dealers in these goods:

Amory, Browne & Co., 29 Thomas St., New York City.

Smith, Hogg & Co., Worth St., New York City.

Treat & Converse, Worth St., New York City.

Testing Olive Oil.

Editor Textile World Record:

Will you give me directions for testing olive oil, which are suited for a manufacturer who does not employ a chemist? Olive (384.)

In another part of this issue appears an article on testing olive oil, obtained in response to the above question.

Testing the Strength of Fibres.

Editor Textile World Record:

Can you give me the address of a manufacturer of a fibre testing instrument? We grow plots of hemp on our experiment farm, treating the soil in different ways, and require an instrument that will show accurately the relative strength of the fibres. Bluegrass (381.)

Instruments for measuring the strength and elasticity of yarn are in use, but we do not know of any device for measuring the strength of fibres before they are spun. The custom in the textile trade is to test the strength of fibres by breaking with the hands. If instruments for testing the strength of fibres are known to any of our readers, we would consider it a favor to have them advise us.

KNITTING DEPARTMENT.

For Knitting Mill Machinery, Equipment and Supplies, see pages 232 to 253. Also Buyers' Index.

KNIT GOODS SITUATION.

The situation at this writing is characterized by uncertainty. Manufacturers are, as a rule, at a loss to know what to do for another season. Goods have been made at popular prices, viz: $1.90 to $2.00 for 25c. grades, $3.50 to $3.75 for 50c. grades, and $7.00 to $7.50 for $1.00 grades, and now, with the yarn and cotton situation as it is, a change is necessary, and the problem for the manufacturer is to determine whether the trade will take lighter weights, lower grades or pay more money.

We are quite sure that the above mentioned prices will continue to be popular so long as Uncle Sam makes coins of these denominations, and in our judgment the talk of doing away with the 25c. garment and making a 29c. garment to take its place will never prove a success with the general trade. We think the manufacturer will have to continue to make goods to retail at 25c., 50c., 75c., and $1.00, even if necessary to use lighter weight and lower grade yarns.

A prominent combination of manufacturers of ladies' low-priced ribbed goods are out with 6 lb. goods at $1.90, 6 1/2 lb. goods at $2.00 and 7 1/2 lb. goods at $2.25, and we have heard of some large orders being placed on these lines.

Another combination of mills who are making both men's fleeces and ladies' ribbed goods state that they are not yet ready to make prices on the men's fleeces, but are offering 6 lb. ladies' ribbed goods at $1.90.

A line of men's 12 lb. ribbed goods with single seated drawer sold last season at $3.50 is now being offered at $3.65 with short dating, but even at this it is a question with a great many how they can be produced when the yarn alone that enters into them costs from 24 to 30c. per dozen more than last season. One representative line of ladies' worsted ribbed vests and pants ranging from $3.75 up to $15.00 is being shown at last year's prices, with some new numbers in fine stitches that are much improved over last year's numbers at the same prices.

Another manufacturer who makes both worsted ribbed and cotton ribbed goods is offering the worsteds at same prices as last season, but has reduced the weight of the cotton goods from 8 1/2 to 8 lbs. This is a line of one-and-one ribs, and the price of same is $3.62 1/2.

As yet we have only learned of one manufacturer who has made prices on men's fleeces for regular trade. This is a garment that sold last season at $3.20 and is now being offered at $3.50 with a slightly better trimming than last year. We have heard of some prices being made on other lines of fleeced goods to export trade, but the singular character of the assortments and other details in connection with this end of the business prevents any price named from being called a criterion.

Manufacturers are pursuing an unusually hesitating policy in making prices. Last year a fair proportion of the business had been concluded at this time, but such is far from being the case this year. Duplicate business has not been good on fleeces, nevertheless many manufacturers have all they can do up to the end of the season. Perhaps this is due, to some extent, to the fact that they have not been working full time, owing to the scarcity of yarns and cotton.

There are indications that the fleece lined ribbed goods business is increasing, and a prominent manufacturer states that he will run two mills on this class of goods entirely, making a range of ladies', men's, and children's goods, both in two-piece garments and combination suits.

Duplicates continue to come in on spring numbers, some of which are accepted at original prices, and slight advances are asked on others. Manufacturers are more independent on balbriggans than on other lines, and in some cases refuse duplicate orders alto-

gether, and in others ask an advance of from 10 to 12 1/2c. per dozen.

It is rumored that some of the orders taken on the low end of balbriggans at from $1.90 to $2.00 will not be filled, some manufacturers stating that it is an impossibility to make the goods at the price.

Many reorders for immediate delivery have been received during the past week, due to healthy weather conditions, and in some cases to the inability of some manufacturers to deliver. Many are now in a better position to make prompt deliveries than they were for some weeks. Buyers are still urging the delivery of the 8 lb. vests and pants sold to them at $1.90 last November and December, and we know of a number of orders that should have been shipped in July and August that are not yet filled.

HOSIERY.

The hosiery end of the business now looks better after a long period of dullness. There has been considerable immediate delivery business the past two weeks as well as many duplicates for spring delivery.

Jobbers are alive to the fact that higher prices must prevail, and are placing orders on fall weights and buying for shipment in January or February for cash whenever concessions can be obtained.

We hear of manufacturers who tried to place orders in October when cotton was at its lowest for some time, but were turned down by spinners who would only take orders for immediate use.

CHEMNITZ.

The conditions of the hosiery market are now much better than they were a few weeks ago. A number of leading buyers have been in town and have placed their orders. Many of these buyers had been delaying placing their orders for staple goods, expecting a drop in prices, but none occurred and they were obliged to pay even more in some cases than was quoted early in the fall, and some qualities that were offered then cannot be obtained today.

Spinning mills have plenty of business on their books to keep them busy until late into the spring.

Lace hosiery is growing again into popularity, and prices are higher than a few weeks ago. Those at the $2.50 limit will soon be out of the market. Lower grades are offered, but are so poor that they find no sale.

Embroidered hose are being bought again but not in the quantities they were last season. Stripes are not popular, and jacquards in ladies' goods are slow. Small effects in extracted goods in fleur de lis and polka dots are bought some, but in small quantities.

Tans are selling well for Spring in medium shades, buyers avoiding the dark, also the very light shades. Some demand for French blues has sprung up.

In men's goods the black and white have given way some to red with blue and similar combinations. Jacquards in men's goods are selling fairly well, while lace half hose are not called for.

Tan shades are taken for men in a trifle darker assortment than for ladies' goods.

Automatic Knitter. The Keystone Knitting Machine Manufacturing Co., Philadelphia, Pa., have recently brought out a full automatic knitter which has been thoroughly tested with the most satisfactory results. An extended reference to this machine will be found in another part of this issue.

Automatic Ribbed Body Knitter. Messrs. G. Stibbe & Co., Leicester, England, are placing on the market an improved rib body knitter. The machine can change automatically from one pattern to another, the range being three patterns. The changes can be utilized to give hosiery of various diameters and thus form garments to a shape.

Automatic Loom. La Societe Alsacienne de Constructions Mecaniques, Mulhouse, Germany, are placing on the market an improved loom for woolen and silk goods. The shuttles are changed automatically when the filling of the bobbin is used up to within about one yard of the end.

Flax was without a competitor in the vegetable fibres till the close of the 18th century, when after a brief struggle cotton superseded it as the supreme vegetable fibre of commerce.

THE DEVELOPMENT OF THE BUR STAND RINGS.

BY S. X.

There are many differences between the American made spring needle knitting machine of fifty years ago and the same machine of today. Prominent among these differences is the great facility for bur stand adjustment in the modern machine as compared to almost no facility in the old machine. A review of the changing conditions that brought about this improvement, and the steps in the improvement conforming to these conditions is of some interest and may possibly lead to still greater advances.

The knitting machine of our grandfathers' time was not a very big affair nor yet a very small one; not small enough to clamp on a

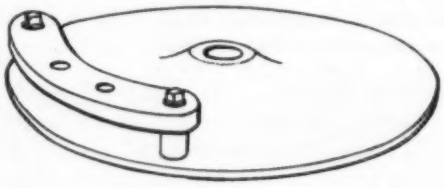


FIG. 1.

table, but large enough to need a table of its own, so the table was made for it and has been retained, the term knitting table being as common here as knitting frame is in England. At first this table supported one cylinder, then two, then many, and then gradually came back to two—the popular number today—with the single cylinder table knocking at the door. In most of the machines the cylinders sat low on the table, so obviously the simplest way of securing the outside bur stands was to screw or bolt them to the table.

There was one machine, however, that owing to its construction had a higher cylinder than the others, and on this machine the stands could not be secured to the table without making them inordinately tall, so a secondary stand table or plate was used and the growth of the adjustable burr stand ring has been more or less closely allied to the changes in this table on a table.

Fig. 1 shows the embryo stand ring—not yet a ring, but curved in that direction. It was a popular impression in the day of this device that even cloth could be made only with one feed to a cylinder, so this plate was drilled with two holes, one for the sinker stand and one for the presser stand. These stands

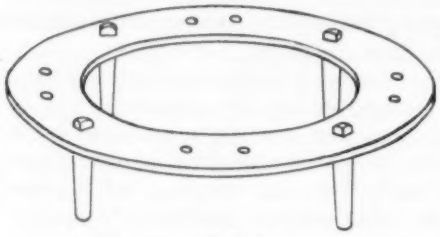


FIG. 2.

had a round foot drilled and tapped in the centre and a cap screw was passed up through the hole in the plate and screwed into the stand to tighten the latter to the plate.

Contemporary machines had holes drilled and tapped in the table and the stand had a flat flange foot drilled to receive a cap screw which was screwed into one of the holes in the table to secure the stand. From these two methods of securing the stand came two of the classes of stands—the "round foot" and the "flat foot,"—the round foot on a little table the under side of which was accessible, the flat foot on a big table, of which only the upper side was readily accessible. Another class of stands, the socket, belongs apparently to a later period.

Consider the flexibility, or rather the inflexibility of these machines. The knitter could put each stand only in the place allotted by the machine maker. Such limitations were not to the liking of the knitter so he procured a ratchet drill and made other holes. Soon he desired to put on another feed. With the machine that had the stands secured to the table proper this was possible by boring extra holes, but not so with the one having the stands on the little secondary table, for its extent was quite limited. Consequently this secondary table had to be changed, and as might have been surmised, the greatest number and variety of changes could be looked for in this secondary table simply because otherwise it would not meet the requirements at all, whereas the other type of machine with stands on the table proper would meet them to an extent.

In response to the demand for more feeds the stand plate was extended step by step until its ends met, forming a ring as illustrated in Fig. 2. This would accommodate holes for feeds enough for the most audacious knitter. So far so good, but close on the heels of the demand for more feeds came the demand for interchangeable cylinders of different sizes, and this demand was met by widening the plate.

Pausing a little to look at the requirements of a bur stand support, it is seen that facility was required for placing the stand in any position around the cylinder, to accommodate different numbers of feeds and arrangements of feeds, also in positions at different distances from the axis of the cylinder to accommodate cylinder sizes from 6 inches to 25 inches in diameter. That is to say, facility was required for placing the stand foot in any location in a horizontal circular plane of about 36 inches diameter. It should be possible to make this change quickly and to hold the stand securely. To a limited extent facility was also desired for rotating the stand or "turning it," to use a more common expression; for although it is a rule of knitting that bur shafts shall stand radial with the axis of the cylinder, limitations of space frequently make it necessary to change this position to one side or the other. The round foot stand and the socket stand have this desirable property. The flat foot stand has it to a degree, a short, flat foot allowing greater range of rotation without interference with neighboring stands than does a long, flat foot. Adjustment for height, and close adjustment toward the centre of the cylinder, are provided for in the stand itself, generally by a vertically movable barrel or tube, and by a screw shaft in the tube respectively, so that these adjustments need not be provided for in the stand supports.

Summarizing, it should be possible to place the stand in any location in a limited horizontal plane, and should be capable of partial rotation. More than this, it is evidently an advantage to be able to make a radial adjustment without losing the circumferential adjustment, or the reverse. Suppose it is desired to "let in" the presser when the presser adjusting nuts are at the end of the thread. Then the stand must be loosened and moved toward the cylinder. Now if the motion permissible in this case is radial only, then the presser will remain in its proper position in regard to the lander and the adjustment is quickly effected, but if, when the stand is loosened, it is free to move in any direction, then the circumferential adjustment will probably be lost, and after the presser is in far enough, it must again be set one way or the other in order to bring it to the right position in relation to the lander. There are but few bur stand supports having this property of independent motion "in-and-out" and "around," and probably in none of them is it perfected.

Looking at Figs. 1 and 2 it is seen that in the light of the requirements these devices were sadly deficient. No change of position was possible except by drilling new holes. Rotation was the only method of adjustment.

So far most of the discussion and both the illustrations have related to the outside bur

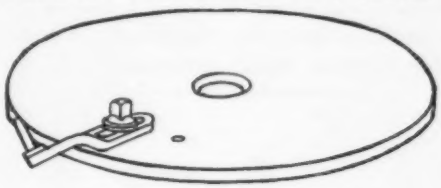


FIG. 3.

supports. It is the inside bur supports that give the first flexibility and ultimately the best examples of it. Fig. 3 shows the inside plate or heart that goes with the machine just described. The bur support is a wrought or malleable iron strap carrying the bur stud at its outer end, and slotted at its inner end for a cap screw which secured it to the flat circular plate, the latter being supported by the upper end of the cylinder stud. Although the screw holes in this plate were arbitrarily fixed, it is evident that in addition to the rotary adjustment possessed by the outside bur stand, radial adjustment was obtainable by means of the slot in the strap.

After a time the slot idea became prominent in the outside plates. The flat foot stand was made in some cases with a slot instead of a hole in the foot. For the round foot stand the plate was slotted, radially or nearly so. Fig. 4 shows a slotted plate that was

quite largely used. The transition from Fig. 2 to Fig. 4 was a long one and included repeated changes, but it would be a waste of time to follow them, as they were made with one object in view, that is, locating the slots

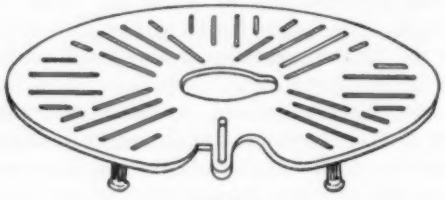


FIG. 4.

so as to satisfy every possible contingency, and that object could not be obtained by any arrangement of fixed slots.

Further changes were made also in the machines using flat footed stands. One of these improved devices is shown in Fig. 5. This plate was screwed fast to the table proper and contained radial slots of inverted T section. Each slot contained a nut tapped to receive the stand cap screw that had formerly been screwed into the table. In this way a considerable range of radial adjustment was made

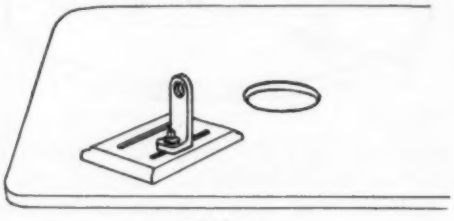


FIG. 5.

available for the flat footed stand and there was no loss of rigidity. A short transverse slot in the foot of the stand gave a slight sideways adjustment. Further adjustment in that

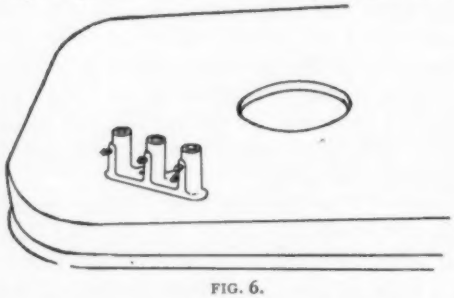


FIG. 6.

direction was possible by moving the plate bodily. The plates were made with different numbers of slots, according to the number of stands required per feed. This device was used extensively on the Campbell & Clute machine.

The socket stand used on machines of the Crane type, shown in Fig. 6, probably belongs to this period. The base plate for each feed is a single casting screwed to the table and having vertical sockets into which fit the cylindrical stems of the stands. This construction was simple and rigid and permitted rotary adjustment, but no other adjustment except bodily movement of the entire feed.

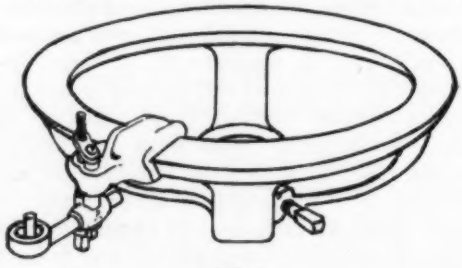


FIG. 7.

The next important step, illustrated at Fig. 7, is the Tompkins Bros. patent inside plate, sometimes called a spider from its appearance when all the brackets and bur arms are in position. This plate is practically universal and it has the desirable property already mentioned of independent radial and circumferential adjustment. It is fairly accessible from the under side. The bur supports are of the socket type already illustrated in Fig. 6.

(To be continued.)

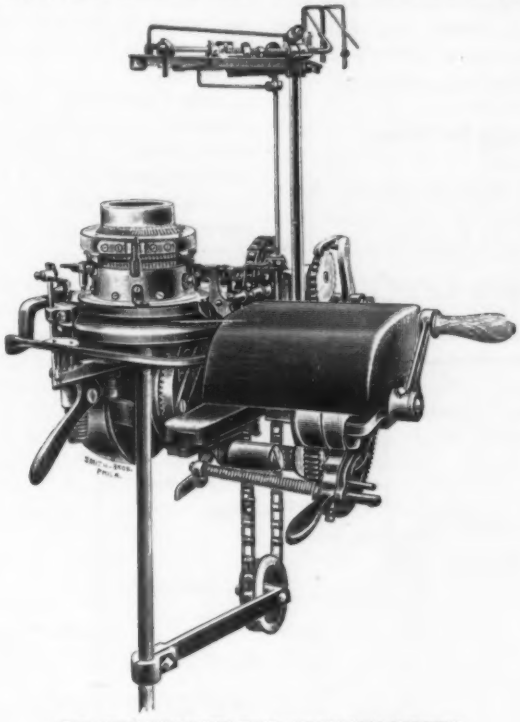
THE NEW KEYSTONE FULL AUTOMATIC KNITTER.

Hosiery manufacturers will be interested in the new hosiery knitting machine built by the Keystone Knitting Machine Manufacturing Co., 2600 North Sixth Street, Philadelphia, Pa., and shown in the accompanying illustration. This company have long been builders of different types of knitting machines which are too well known to require special reference here. The new machine has been thoroughly tested in many mills and demonstrated that it possesses many advantages. A large production is obtained from a single machine and one operator can look after a large number of them. It is said that

on women's plain hosiery one hand can tend twenty-five machines. On half hose a girl operator takes care of six machines if the topping is done for her and will turn out thirty-five dozens of 176-needle goods per day. Some mills have found it advisable to have one girl run three machines and do her own topping. In either case the production per machine remains practically the same.

The machine is compact and occupies a small amount of space. It is light running and easily driven with a 3/4-inch belt. It has a simple and positive heel and toe splice, a take-up spring locking device that prevents holes in the corner of the gore at heel or toe, a rocking sinker that does not wear and which consequently prevents uneven work. These machines are built with two cylinders or with one cylinder and a quill ring for transfer work. The builders believe the last-named arrangement is the better one because with it not only can the operator transfer more quickly than with two cylinders, but there is also a decided advantage in not having to remove the needle cylinder from the machine. It is well known that the carelessness of the operator in taking out and replacing needle cylinders is the cause of more difficulties in knitting than all other defects in the machine combined.

With the Keystone knitter the method of transferring is very simple and a girl becomes a knitter as soon as she learns to top. The grade of goods can be changed simply by changing the needle cylinder and with no other expense. There is no lost motion or friction caused by the sinking ring. Another valuable feature is found in the elevating cylinder clamp ring. If the machine should, at any time, knit out of level, it can be thrown into the correct position by a regulating device without the necessity of packing or filing.



THE NEW KEYSTONE FULL AUTOMATIC KNITTER.

The automatic features are regulated by one link of the chain. If this link is kept in proper position the movements of the different parts cannot become disarranged. There are no delicate attachments to be made and knitters will appreciate the absence of friction device. All automatic attachments are on the top of the machine bed where they can be easily examined. There are no tight

pulleys, only one set of links, and any tension desired can be obtained for the body of the goods independently of heel and toe. Each machine is furnished with a device for ladies' hose, and the reverse motion and clutch is very simple in operation. The results obtained with this machine have demonstrated its merits beyond a doubt, and the builders are desirous of submitting it to any manufacturer at his mill where the various attachments can be clearly shown.

This company are also makers of latch needles which they supply to mills in all parts of the country. They carry 500 different sizes in stock and are thus able to supply promptly the wants of any manufacturer.

The First Knitting by Power.

As several of our correspondents have questioned the accuracy of the statements made in our October issue regarding the first power knitting mill, we have had a careful investigation of the question made in Cohoes and the results are given in the following letter:

Cohoes, N. Y., Nov. 26, 1903.

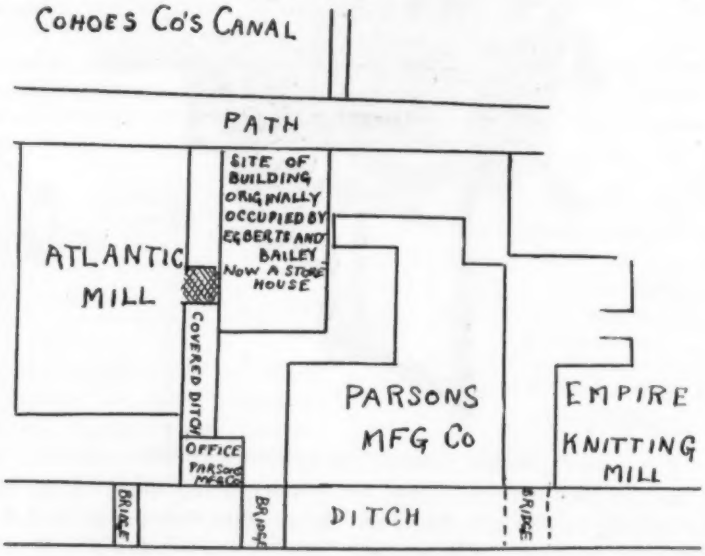
Editor Textile World Record:

On referring to local histories and interviewing old residents of Cohoes I find that the mill illustrated in your October issue is not that in which goods were first knit by power in this country. Power knitting in this country was first carried on in what was known as the Miller cotton factory in which Egberts and Bailey started in the knitting business in 1832. I enclose a map giving the exact location of this mill. After Egberts and Bailey left the building the portion which they had occupied was used by Timothy Bailey and later by others, among whom were J. G. Root & Co., who operated it after 1855 under the name of the Tivoli Mill.

The Miller building was torn down in 1898 and replaced by the brick building now occupied by the Parsons Mfg. Co. as a storehouse. The stone walls of the wheel-pit enclosure of the original Miller building are still standing. This wheel-pit is between the Parsons storehouse and the Atlantic Mill, and directly back of the office of the Parsons Mfg. Co.

This Egberts and Bailey mill was doubtless the original power knitting mill in this country, but I think there is considerable doubt whether it was the first power knitting mill in the world. This is a question that should receive more thorough investigation than I have been able to give it.

Mohawk Valley.



LOCATION OF THE FIRST POWER KNITTING MILLS, COHOES, N. Y.

We have received another letter on the same subject which confirms the conclusions of our Cohoes correspondent:

Round Lake, N. Y., Nov. 21, 1903.

Editor Textile World Record:

In the November issue of your journal several correspondents have questioned the accuracy of the statement made by Hugh P. Graham as to the first knitting by power. I am loath to say there is an error in the same, but the picture given on page

137 of the mill or factory shows the second and not the first knitting mill where power was first applied to knitting-frames. The old part, which still remains in connection with the main building, where carding, spinning, etc., were carried on, extends toward the south and is not visible. The picture as seen faces north with the end or gable toward the west; that part was rebuilt a long time ago and this was the second mill where power was applied to knitting frames.

Mr. Graham is correct as to the year, 1832, when Egberts and Bailey commenced to manufacture shirts and drawers, but it was not in the mill which he illustrates, as that mill was not built until 1843. The mill in which goods were first knit by power was built by a Mr. Miller from Charleston, S. C., in 1831 or 1832 for the purpose of manufacturing cotton goods. For some cause it was not started until Egberts and Bailey built some frames, eight in number, heavy jack and sinker frames, which, when in operation, could be heard with a whir, whir, a long way off. The original height of this mill was three stories; the frames were in the first story, all that remains of the mill today. It was converted into a storehouse for the Parsons Mfg. Co. back of their mills on the Erie canal. I set up carding and spinning machinery in this mill fifty years ago for Thomas Fowler, who was then owner of the mill.

For a fuller description of this mill I refer your readers to the Textile World of April, 1889, and November, 1897, "Knitting in the Fifties," also to July, 1897, "History of Egbert Egberts," Sept., 1901, "Sketch of Chas. H. Adams," a nephew of Mr. Egberts and an old acquaintance of mine.

Andrew Scotland.

Using Hosiery Waste.

Editor Textile World Record:

What is the best way of disposing of the waste from knitting machines; such as a perfect foot with the upper part only about one-half or one-third the length it should be? Sometimes the leg is perfect and a flaw in the heel or toe makes the goods useless for wearing, even for seconds.

On half-hose we have a great many tops that are just a fraction too short. Again a great many are topped correctly, and after the machine runs a few rounds the thread may give out, thereby causing a loss of the tops. We also have a great deal of short clipping from the loopers; this can only be sold as waste, but the other, I should think, could be put to some advantage. If a raveling machine could be used to advantage, will you kindly give me some idea as to the amount of production from one of these machines, and about what it would cost? Could an operative make as much as $1 per day and allow the mill to come out to an advantage on the raveling machine?

Universal (379)

The manager of a knitting mill replies to this question as follows:

The best way is to ravel the goods and either knit the yarn over again into the same kind of goods, or use it for some other style. Whether it is profitable to ravel, however, depends largely upon the kind and quality of the yarn used. With high priced yarns such as combed peeler, combed Egyptian and mercerized yarn, there is no question but that it is profitable to ravel and re-knit the yarn.

In a hosiery mill making its own wool yarn, in coarse numbers from 20 to 40 grains for 12 yards, (1 1/4 to 3 runs) one girl is kept busy raveling the legs and feet, the heel and toe parts being put into the waste. This girl makes about $5 per week on piece work at 10 cents per pound, for these numbers. Some of these numbers were knit with two threads and in this case the raveled yarn was knit back into the same goods.

Raveled yarn is not so strong as before being knit, and except in the case of hard twisted yarns would not be strong enough to re-knit; single soft yarn thus raveled could be run two threads together into some other kind of goods requiring heavier yarn. For this purpose the winder bobbin is placed on a spindle running horizontally, and connected with an ordinary sewing machine transmitter, so that the girl could sit while at work and start and stop the bobbin with her foot, holding the piece being raveled in her hand. This is a very cheap arrangement.

A better arrangement than this could be devised so that a girl could ravel and re-wind on three or four bobbins at the same time. This could be done by using the regular winder in the mill, having an arrangement in front of the bobbins to which the pieces would be held by a clamp arrangement while being raveled, and in this way the cost per pound would be considerably less than ten cents. Stocking legs in which there are splicing threads for a double knee could not very well be raveled, but the part with the splicing thread could be cut out and the rest of the leg raveled.

The price to be paid per pound for raveling and re-winding depends, of course, on the sizes of the yarn, also on the quantity per day, but I think it may be stated that, except in the case of very cheap and poor yarn, it will be profitable to ravel and re-knit the spoiled legs and feet made on hosiery machines, provided mechanical arrangements are made so that more than one piece can be raveled at once. The clippings from loopers and ravelings from toppers can be sold only as waste.

Maine, Springvale. The Mousam River Mill has gone out of business.

IMPROVEMENT IN KNITTING NEEDLES

The Dodge Needle Company of Manchester, N. H., had letters patent issued to them Nov. 3, 1903, for a valuable improvement in fastening the rivets in latch needles. Fig. 1 shows one form of needle, the head of the rivet being depressed or sunken below the side walls of the needle, as more fully shown

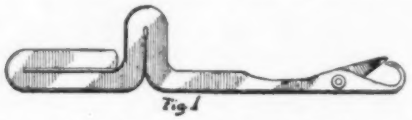


Fig. 1

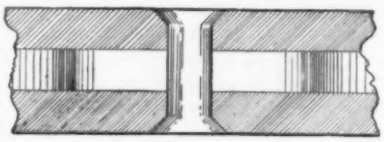


Fig. 2

by Figs. 3 and 4, which illustrate the method of finishing the rivet heads to prevent them working loose and catching the fibres of yarn as very commonly happens in using needles with the ordinary style of rivet head.

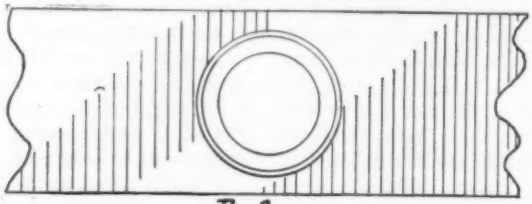


Fig. 3

Fig. 2 is a section of a needle through the rivet, showing it as if headed down and finished off smooth over the heads. If the rivet in such a needle works loose the fibres of yarn catch on the sharp edge of the rivet heads. Fig. 4 shows how this rivet and heads of the same look after being finished by the new method as patented Nov. 3, 1903. By this method the rivet and heads as well as a portion of the surrounding walls of the needle body are compressed so as to swell the centre of the rivet, and depress the rivet heads below the surface of the body or side walls of the needle, low enough so that the fibres of yarn cannot catch on the heads; the swelled centre of the rivet prevents it from working far enough out of the needle to catch the yarn even if the heads were to get loose. This improvement very materially increases the usefulness or length of life of the needle, as has been shown during the past five years, the Dodge Needle Company having supplied a large number of knitting mills with this improved needle during that time.

Other parties have imitated this needle, but the recent decision of the United States Patent Office is to the effect that the Dodge

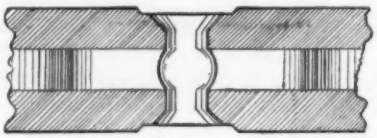


Fig. 4

Needle Company of Manchester, N. H., is the owner of the broad principle of depressing the rivet ends together with the surrounding side walls of the needle below the surface of the body of the needle. The increasing sale of this needle shows that the merits of it are appreciated by the knitting mills.

Recent Knitting Patents.

HOSIERY. SEAMLESS. 743,231. George Blood, Jr., Philadelphia, Pa., assignor to Kilbourn Knitting Machine Co., New Brunswick, N. J.

KNITTING MACHINE. Fancy. 742,358. George A. Sanders, Laconia, N. H.

KNITTING MACHINE. 744,311. John C. Duemler, South Bethlehem, Pa., assignor to John E. Lonergan and Henry Brinton, Philadelphia, Pa.

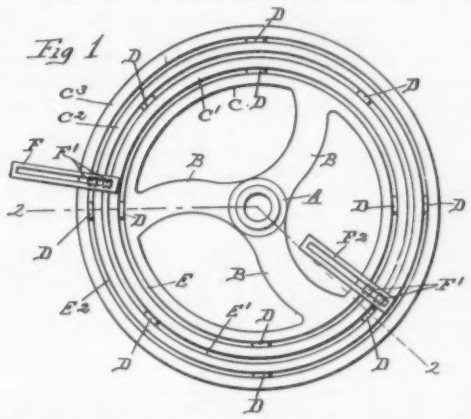
KNITTING MACHINES. Mechanical Movement for Use in. 743,398. Robert W. Scott, Philadelphia, Pa., Louis N. D. Williams, Ashbourne, Pa., and Harry Swinglehurst, Philadelphia, Pa., assignors to Scott and Williams.

KNITTING MACHINE Needle. 743,152. Arthur Currier, Manchester, N. H., assignor to Dodge Needle Co., Manchester, N. H.

KNITTING MACHINES. Feed Circle for Circular. 742,628. Robert Gormly, Troy, N. Y.

Figure 1 is a top plan view of this improved feed-circle.

The object of this invention is to provide a more stable support for the brackets or stands of a cir-



cular-knitting machine and at the same time to adapt the feed-circle of such machines for use with cylinders of widely-different size without the removal of the brackets or stands also, to facilitate the adjustment of the stands.

KNITTING MILL NEWS.

New Mills.

California, Los Angeles. John E. Collins, 215 North Broadway, is investigating prospects for a small hosiery mill at this place.

Illinois, Chicago. Ed. Strauss has started a knitting plant at 260 E. Division Street, making golf jackets, men's heavy sweaters and hosiery. Mill is equipped with 18 knitting machines.

Indiana, Michigan City. The stockholders of the Lakeside Knitting Co. will hold a meeting to consider plans for the proposed new mill. They will also consider propositions from other towns relative to locating elsewhere.

*New Hampshire, Laconia. At a special meeting held by the city council it was voted to exempt H. H. Wood & Co. from taxation for a period of ten years, on new mill building to be built, replacing plant destroyed by fire.

*New Jersey, Haddonfield. Mr. Robert T. Wood, superintendent and one of the proprietors of the Estaugh Knitting Mill, now about to start up at Haddonfield, N. J., with 5 Nye & Tredick machines, states that he learned the business of manufacturing underwear with H. K. Deisher of Kutztown, Pa., and left him to take a position with the Bowling Green Knitting Mills, Bowling Green, S. C., which he occupied for several years. He then concluded to start in the business for himself, deciding to start up in his native town of Haddonfield, N. J., where he has every promise of meeting with success.

*New York, Camden. The Camden Textile Co., reported incorporated with capital stock of $15,000, has begun operations. W. J. F. Van Allen is president of the company; E. S. Babcock, treasurer, and John Pennington, superintendent and buyer. Twenty knitting and fifteen sewing machines are operated on ladies' and misses' worsted and cotton union suits. Steam power is used. Converse, Stanton & Co. are the selling agents.

*New York, Nichols. The Nichols Knitting Mills have installed eighteen new knitting machines in the plant.

*North Carolina, Albemarle. The Wiscassett Mills Co. expect to begin operations in a few weeks in their new building, which is to be equipped for spinning and knitting. They will operate about 500 knitting machines.

*North Carolina, Winston-Salem. P. K. Green advises us that W. A. Blair will be interested with him in the manufacture of misses' rib hosiery, plant having capacity of 300 dozen per day. They are remodeling Dr. J. F. Shaffeur's mill building, 40 by 50 feet, three stories, and have purchased McMichael and Wildman ribbers and Mayo knitters, also the necessary dyeing and finishing equipment. They expect to start production of goods in about 30 days. If they find labor justifiable, expect to incorporate and build a new building and equip same for full fashioned hosiery also.

Enlargements and Improvements.

*Georgia, Barnesville. The work is progressing on large addition to the Oxford Knitting Mill.

Massachusetts, Worcester. The Aetna Knitting Co. is increasing the capacity of the mill nearly one-third. A new set of cards have been put in and work is nearly finished on installation of 100 new knitting machines. Concern manufactures men's heavy woolen socks.

*Georgia, Barnesville. The Gem Knitting Mills, reported to install a bleachery in the plant, have under construction a three story brick building, 40 by 60 feet, for this purpose. They will also install some additional knitting machinery. The concern manufactures women's underwear and hosiery.

Michigan, Grand Rapids. Work has been started on erection of a large addition to the Grand Rapids Felt Boot Co.'s mill. The building will be three stories high and is expected to be completed about the last of December.

New York, Broadalbin. Contract has been let by the Broadalbin Knitting Company for building 30 by 40 feet, brick and stone, to be equipped as shoddy mill.

New York, New Hartford. A new building, 45 by 85 feet, four stories, is under construction for the Maxwell Manufacturing Co., manufacturers of underwear. One room will be utilized for finishing and another for cutting. New machinery will be installed, doubling the present capacity.

Pennsylvania, Philadelphia. The Standard Hosiery Company, 1310 Lawrence Street, report that they are very busy, being entirely sold up until the first of the year. Many changes and additions have been made to the establishment and 48 knitters, 32 ribbers, 4 loopers have been put in within a short time. The company has just compiled what they call "A Ready Reckoner," a card showing the prices of hosiery from 1 to 50 dozens,

which they are about to send out to the trade and which no doubt will be found of much value by the users in purchasing their goods.

Pennsylvania, Philadelphia. William A. Ackerman & Bro., Mascher and Oxford Streets, manufacturers of children's and misses' hose, report business as good. They have recently added 20 new machines. Their production is about 500 dozen per day the goods being sold direct.

Pennsylvania, Philadelphia. Justus Koch, manufacturing cardigan jackets, sweaters, athletic goods, etc., at 1051 Frankford Avenue, is extremely busy. This mill is one year behind in its orders but is now getting its samples out for next year's trade. Twenty flat and round machines have been added to the plant. W. K. Thudium is the manager of the establishment.

Tennessee, Lenoir City. The Dixie Hosiery Mills have installed a 150 h. p. engine in the mill and purchased 2,000 spindles, for purpose of manufacturing their own yarn.

Wisconsin, Sheboygan. The Sheboygan Knitting Co., manufacturers hosiery, knit hats, gloves and mittens is to build an addition to the mill.

Mills Starting Up.

Pennsylvania, Philadelphia. E. Noon & Son, 4019 Germantown Ave., after being shut down for several months, have again started up their factory and are now working on samples which they expect to put on the market within a short time. They manufacture cotton hosiery and underwear which they dye and finish and sell direct.

Mills Shutting Down.

Georgia, Griffin. The Griffin Knitting Mills have been shut down. They have been unable to have their orders filled for yarns and being between seasons they deemed it best to close until matters could be arranged satisfactorily. W. H. Brayton, the superintendent, has taken a position at Portsmouth, Va.

New York, Amsterdam. Yund, Kennedy & Yund's mill has been shut down. Repairs will be made to the mill during the shut down.

New York, Mechanicville. The Mechanicville Knitting Co. has closed the mill for a short time.

*Pennsylvania, Philadelphia. Messrs. S. K. & J. K. Cohen, operating the Swissonia Knitting Mills, at Wayne and Bristol Streets, are no longer in business. The machinery has been disposed of and the factory vacated. This company run on women's Swiss ribbed underwear.

Pennsylvania, Philadelphia. Frank Henderson, who, for many years, has been in the knitting business at 449 Haines Street, has decided to close up his plant. Mr. Henderson has accepted a position with the Brown-Aberle Co. where he is now working.

Facts and Gossip.

Georgia, Atlanta. Application has been made for a charter for the Piedmont Knitting Mills by James Milmow, T. C. Waters and James E. Belcher. They propose incorporating with capital stock of $6,000, with privilege of increasing to $100,000. This may be an incorporation of mill now known as the Milmow Hosiery Mill.

New York, Boonville. The Mystic Knitting Mill is reported to remove the plant to Fonda and will occupy the Cushney Building. The town of Fonda raised $1,500 toward the moving expenses.

New York, Crown Point. The Empire State Mills, inc., are now in operation at this place. The company manufactures knit specialties. G. W. Foote is president of the concern; G. A. Sidebotham, secretary and treasurer, and W. H. Spanswick, general manager. This concern undoubtedly operates the plant formerly operated by the Crown Point Knitting Co.

New York, Utica. The Fisher Textile Co. has been organized with Wm. E. Lewis, president; John B. Whitten, treasurer and J. D. Lynch, secretary. This concern manufactures mercerized knit cloth.

Pennsylvania, Philadelphia. It is reported that M. K. Adams, formerly superintendent of the Harrisburg Knitting Mills, Harrisburg, Pa., has started in the knitting business at Norris & Belgrade Streets.

Pennsylvania, Philadeljhia. J. Wrightson & Co., 1907 N. 6th Street, report being very busy on their fancy cotton hosiery. They have just filled a large order for their goods to be shipped to Cuba which has met with much favor with that country. Mr. Wrightson is a nephew of Mr. Arthur Wrightson who, before his death, was well known as a builder of knitting machinery.

Personals.

Charles W. Adams, late of Derby, Conn., has accepted the position of machine fixer with Radcliffe Bros., Shelton, Conn.

Bert L. Brown, late of Chester, Vt., has engaged with Radcliffe Bros., Shelton, Conn., as fixer.

Edward S. Burkhart, late of West Rutland, Mass., where he has had charge of carding for the Lakeville Woolen Co., is now carder and spinner with the J. & R. McLaren Knitting Co., West Sand Lake, N. Y.

George Charles McCoy, late of Valatie, N. Y., is now second hand in the knitting department of the Royal Gem Mills, Herkimer, N. Y.

John M. Allen, late of Oneida, N. Y., where he was with the Oneida Hosiery Co., has accepted the position of foreman of the hosiery department of the Utica Hosiery Co., Utica, N. Y.

Andrew J. Clark, who has been identified with the Kendall Knitting Co., Utica, N. Y., for several years, has accepted the position of general superintendent of the Camden (N. Y.) Knitting Company, succeeding John Pennington. The latter is now connected with the Camden (N. Y.) Textile Company, recently incorporated.

Seeley Montayne is superintendent of the Kingston (Ont.) Hosiery Company, having resigned from the Oneita Knitting Mills, Utica, N. Y.

Robert Sprowson is the new carder at the Utica Knitting Co.'s yarn mill, Sherburne, N. Y. He came from Fitchburg, Mass.

A. J. Clark, formerly knitter at the Regal Textile Co., Utica, N. Y., will succeed John Bennington as superintendent of the Camden, N. Y., mills.

New Machinery and Processes.

This department is designed to present from month to month a brief mention of new machinery, devices, and processes being brought out in this country and abroad, that are of interest to textile manufacturers. It is not a list of patents, but of improvements coming on the market. The idea being to present to our readers a systematic monthly record of new machinery, etc., of interest to textile mill men.
We invite machine builders and others to send us such information for this department.

Machine for Dyeing Cops. L. H. A. Schwartz, Boston, Mass., is the American agent for a German dyeing machine which is in successful use in Europe for dyeing yarn on cops and spools. The machine is based on the circulating process by which the dye liquor is forced through the yarn by a centrifugal pump. It is claimed that the material dyed with this process is in much better condition than when dyed in the skein, and that there is a considerable saving of time and dyestuff.

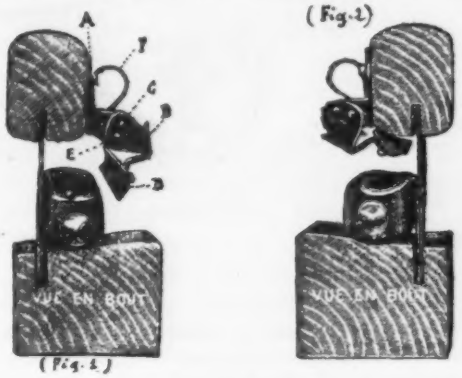
Key Seating Attachment. The D. E. Whiton Machine Co. of New London, Conn., has recently designed and placed on the market an attachment for cutting key seats for the well known Woodruff system of keying. This attachment is designed for use on the Whiton Gear Cutting Machines and consists of a base to rest on the bed of the machine with a V groove in which the work is held. A strap passes over the work to be keyed, and through the strap a set screw is used to hold the work rigid. A special spindle, spindle box and spindle gear for holding the necessary cutters are provided, to interchange with the regular fixtures, and there is also a stop motion for uniform depth of cut.

Traverse Motion. Logan Owen, Macon, Ga., has perfected and is placing on the market a traverse motion for roving guides. Mr. Owen has been superintendent of the Bibb Manufacturing Co., Macon, Ga., for fifteen years and this traverse motion is the result of his experience and observation. Among the advantages claimed for it is that it prolongs the life of rollers and that from its connection with the builder reel the motion is varied, growing shorter as the bobbin is built. No. 1 Mill of the Bibb Mfg. Co. is equipped with the Owen traverse and the claims made for it are based upon a year's experience with it in this mill.

Corliss Engine. Allis-Chalmers Co., Chicago, Ill., are placing on the market a new Corliss engine which has been constructed from designs of Irving H. Reynolds. A description of this engine appears in another part of this issue.

Mercerizing Machine for Skein Yarn. Neiderlahnsteiner Maschinenfabrik, Niederlahnstein, Germany, is placing on the German market a mercerizing machine for skein yarn. A short description appears in another part of this issue.

Shuttle Guard. J. Bruey, Ronchamp, France, has recently placed on the market a new form of shuttle designed to meet the exacting requirements of the French law for protecting employees, and shown in the accompanying illustration. It consists of a bar held a short distance in front of the reed by



SHUTTLE GUARD.

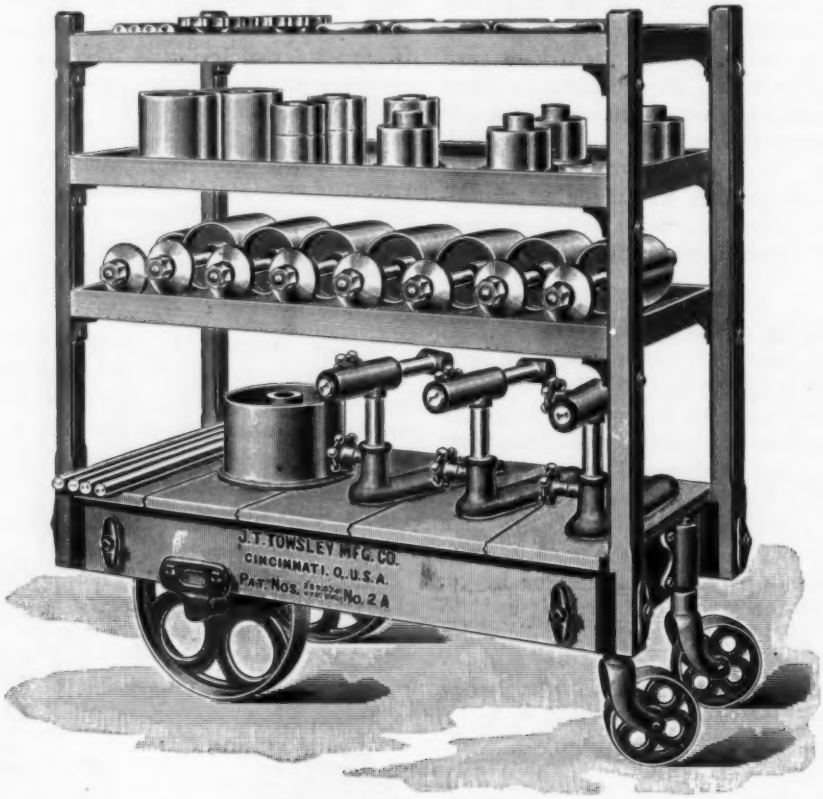
adjustable supports and preventing the shuttle from flying out during its passage across the loom. When the loom is stopped the guard is thrown out of position and the bar is held under the cross-bar of the reed out of the way of the weaver.

Thimbles when first used were worn on the thumb and called thumb-bells.

MILL AND MACHINE SHOP TRUCKS.

Trucks are a necessity in every department of a textile mill and no mill is well organized until each process is provided with a truck specially designed for the use to which it is put. Trucks are needed for baled stock, loose raw material, for scoured and colored stock in the wet state before and after extracting, for wool saturated with acid, for dry stock, for picked stock, for material in the form of sliver, roving or spun yarn on short spools, bobbins or long spools, trucks for warps on loom beams, for woven cloth, for cloth in each of the many processes of wet and dry finishing, for finished cloth ready for the case and, finally, for the cases ready for shipment.

These are but a small part of the many uses of mill trucks, and for each the style and size should be specially adapted. A heavy cumbersome truck exhausts the strength of the workmen, delays the work, restricts production and in many cases causes serious damage by staining or tearing the cloth. A light, strong, easy-running truck, built for a special use expedites operations, saves labor, prevents damage to the material, and in many cases overcomes the disadvantages of poorly arranged mill buildings.



THE TOWSLEY ASSEMBLING TRUCK.

The success of mechanical operations in textile manufacturing, the economy of mill operations, depend on the science of trucks. To one who has not given the subject careful consideration this may seem an exaggerated view. It is, however, a mild statement of the case. Without trucks every modern textile mill would be brought to a standstill. The form, size and general construction of mill trucks are, therefore, subjects of great importance which, unfortunately, have been sadly neglected. This is not the case in all other industries. Machine builders have given care-

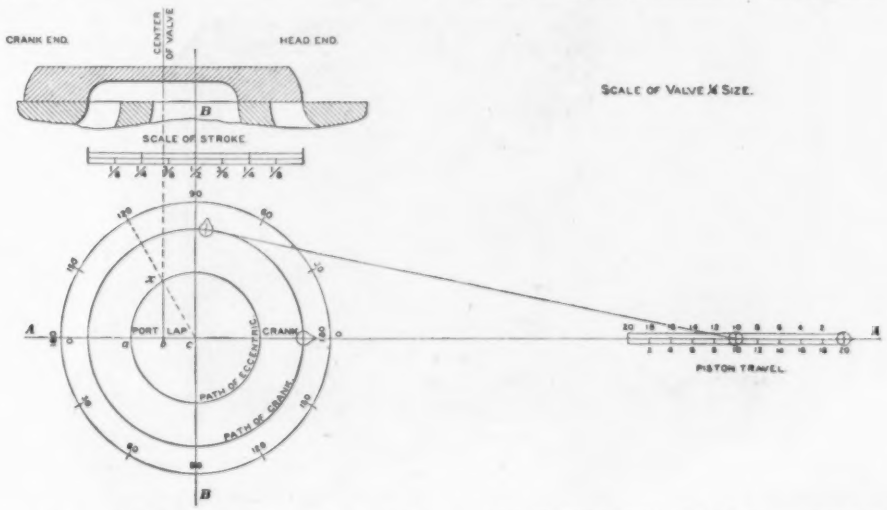
ful attention to these problems of interior transportation and an excellent example of modern construction of trucks is found in the four-wheel assembling truck, shown in the accompanying illustration and built by the John T. Towsley Manufacturing Co., 1075 to 1083 Evans St., Cincinnati, Ohio.

These trucks are designed to assemble parts of machinery as it is being milled out, and to convey it from one machine and one part of the factory to another. Where machinery is being milled out in large lots this truck is a great saver of time and labor, particularly in the erecting rooms besides systematizing the factory. It is as necessary in well-equipped factories as the most modern tool, as it handles the output of the tools economically until they are assembled. The wheels are arranged to keep the truck level with the floor and yet turn in a small space. The iron work is finished in black enamel paint and the wood-work is oiled or varnished. Roller bearings are furnished on large and small wheels at extra cost if desired.

These machine shop trucks are built in different styles and sizes to suit various purposes, and in addition to them the Towsley Manufacturing Co. are prepared to build special trucks for textile mill work. Some idea of the popularity of their assembling trucks can be had by a glance at a list of some of the representative machine shops of the country using them:

The Cincinnati Milling Machine Company, Cincinnati, Ohio; Lodge & Shipley Machine Tool Co., Cincinnati, Ohio; R. K. LeBlond, Cincinnati, Ohio; Ashcroft Manufacturing Co., Bridgeport, Conn.; Baxter D. Whitney, Winchendon, Mass.; Fitchburg Machine Works, Fitchburg, Mass.; G. A. Gray & Co., Cincinnati, Ohio; Utica Drop Forge & Tool Co., Utica, N. Y.; Bullard Machine Tool Co., Bridgeport, Conn.; Warner Elevator M'f'g Co., Cincinnati, Ohio; Warner & Swasey Co., Cleveland, Ohio; Schumacher & Boye, Cincinnati, O.; Diamond Meter Co., Peoria, Ill.; Niles Tool Works, Hamilton, Ohio; Landis Tool Co., Waynesboro, Pa.; Kempsmith Machine Tool Co., Milwaukee, Wis.; Prentiss Tool & Supply Co., New York City; Wilmore Computing Scale Co., Newark, N. J.; Dexter Folder Co., Pearl River, N. Y.; Chicago Screw Co., Chicago, Ill.; Standard Anti-Friction Equipment Co., Wilkesbarre, Pa.

Further information in regard to these trucks can be had upon application to the builders.



OF INTEREST TO THE ENGINEER.

The Lunkenheimer Company, Cincinnati, Ohio, are showing commendable enterprise in sending to engineers upon request a chart which is designed to provide accurate, convenient and practical means for following the intricate movements of the slide valve without the aid of formulae or complicated geometrical drawings. Its utility consists in the true delineation of the progression of movements which occur during one revolution of an engine's wheel, and the effects produced by changing or altering any of the parts comprising the valve and gear.

It determines the positions due to angularity, and the slow and fast periods of piston

and eccentric. The chart demonstrates the complex movements in wheel-governor gear and the intricacies involved in the link. Unlike a model applicable to one design or size only, this chart is universal in the scope of its applications, and is correct for all designs, dimensions and requirements.

The use of the chart is so simple that very few directions are required. The few that are necessary are supplied in a booklet which also contains much useful information regarding the properties of saturated steam.

The Lunkenheimer Company are manufacturers of brass and iron steam specialties and engineers' appliances. They have a branch office at 26 Cortlandt St., New York, and are thus in position to attend promptly to orders from Eastern customers. We advise manufacturers to correspond with them and obtain a copy of this chart for the engineer and information regarding their extensive line of goods.

In the far East the umbrella is regarded as a mark of distinction and an emblem of royalty.

THE REEVES VARIABLE SPEED TRANSMISSION.

The desirability of a device for regulating the speed of machinery while in motion is recognized by nearly all manufacturers. Such a device is especially desirable for many of the processes of textile manufacturing among which may be mentioned the drying of loose stock and piece goods; it is also of great value when applied to carbonizing and ageing machines. The application of a system of variable transmission to textile machinery has heretofore been restricted by the somewhat unsatisfactory results obtained from the early appliances placed on the market. These defects have, fortunately, been remedied, and at present variable speed devices are built for nearly every class of machinery. Among those that have proved their merit by practical service is the Reeves variable speed transmission, illustrated at Figs. 1 and 2.

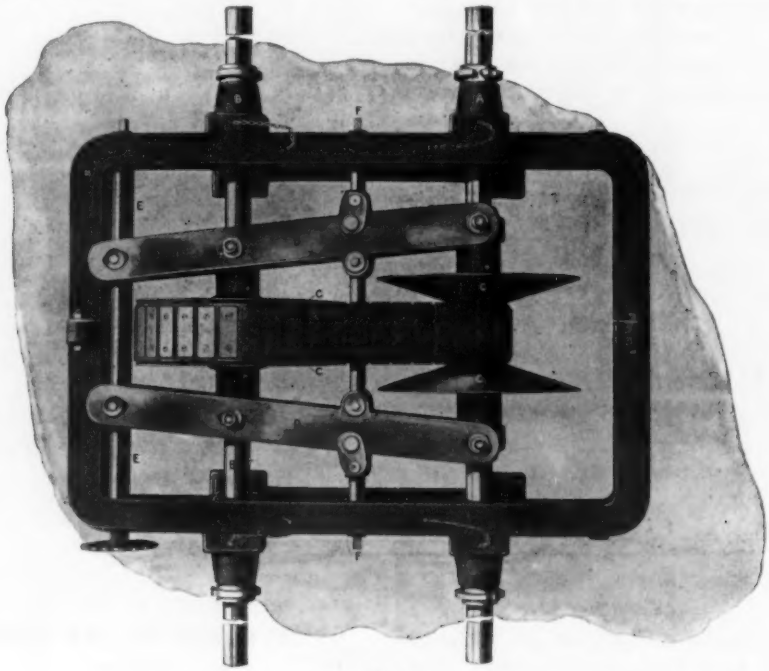


FIG. 1.

The conspicuous features, it will be observed, are two sets of cone disks, spline-

mounted on two parallel shafts; one disk of each set is attached to a peculiarly pivoted bar, which bar is operated by a screw in such manner as to bring together one set of disks as the other set is forced apart, the combination of bars and pivots being such as to preserve a substantially uniform tension of belt. This uniformity of tension is of the utmost importance and secures the perfect operation of our machine.

belt; (d) levers pivoted between the shafts carrying roller-bearing thrust collars, which take against the hubs of the disks; (e) right and left screw shaft, which actuates levers simultaneously in opposite directions; (f) the take-up screw for giving V belt the required tension. Fig. 1 shows the disks on the driving shaft separated to admit the V belt to the smallest driving surface and the disks on the driven shaft brought correspondingly to-

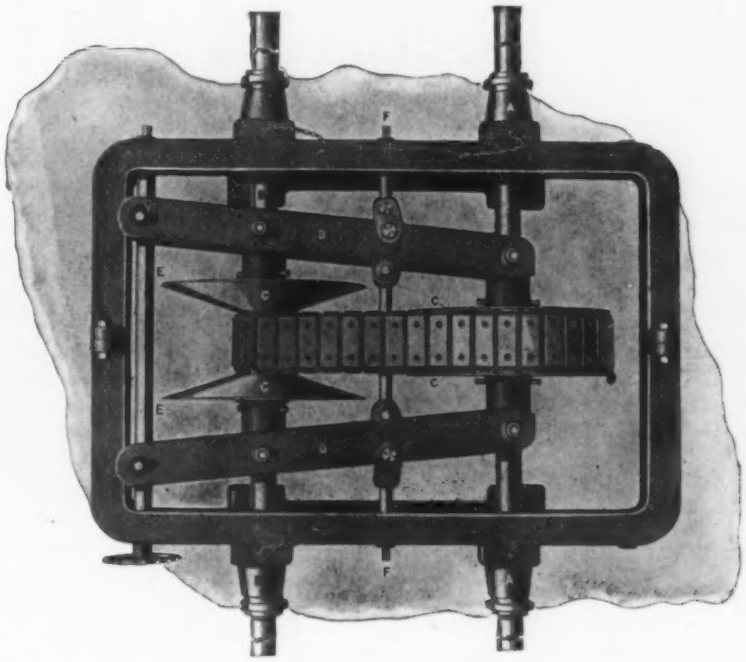


FIG. 2.

The inner sides of these disks, as will be seen, form a V-shaped groove in which is fitted an especially designed belt, having its tractional bearing on the edges instead of the bottom, as in an ordinary belt.

The operation is very simple. One set of disks acts as driver, the other as driven. As the driving circumference of one is increased the other is decreased; the power is transmitted and the variation anything within the compass of the two extremes.

The different parts of the machine are represented by letters of which (a) is the driving shaft; (b) the driven shaft; (c) the disks, spline mounted, with apexes facing, forming a V-shaped groove for the reception of the

gether, so that the V belt assumes the greatest driving surface, thus propelling the driven shaft at its minimum speed. Fig. 2 shows exactly the opposite conditions, whereby the V belt on the driving shaft assumes the largest driving surface and the driven the smallest, thus propelling the driven shaft at its maximum speed.

These appliances are built in a wide range of sizes and can be applied to nearly every kind of machinery requiring variable speed. The table shown at Fig. 3 gives the dimensions of each size of machine, 0 to 6, the letters corresponding to those on the accompanying diagram, and will be found useful in locating and setting up the apparatus. These

Transmissions are built in larger sizes for transmitting as much as 150 H. P. We did not deem it necessary to publish the dimensions of the sizes above No. 6, as the requirements of textile mills would not ordinarily demand a larger machine.

Size of Machine	A	B	C	D	E	F	G	H	*I	J	K	L	M	N	O	R	S	Hanger Bolts
0	10	6½	13	6	5⅛	7¾₆	8⅛	30⅜	9⅛	1 7/16	7	26½	7⅛	3⅛	3½	5¼	2⅛	½
1	12	7½	15	7 1/16	5⅛	8½	9⅜	34¾	10¼	1 7/16	8	28¾	8⅛	3⅛	3½	6¼	2⅛	½
2	15	9	18	8¾	6	11	12¼	42½	13¼	1 15/16	10	36	11 1/16	4½	4½	8⅛	3½	⅝
3	18	11	22	10	7	11 7/16	13½	49	13 11/16	1 15/16	12	38	13¼	6	4½	9¼	3½	⅝
4	21	12½	25	12½	8	13 3/16	17	59	17 7/16	2 7/16	14	45	14⅜	6	6	10½	4½	⅝
5	24	14	28	14	8	15 3/16	18½	65	19 7/16	2 3/16	16	49	15⅞	6	6	12	4½	⅝
6	30	18	36	16½	10	18⅝	21	78	23¾	2¾	20	60	20½	7	7	14	4½	⅝

FIG. 3.

This device is now in successful operation in a number of print works and bleacheries as well as in a large number of mills and shops outside of the textile industry. Further information can be obtained upon application to the Reeves Pulley Co., Columbus, Indiana.

Spindle Oiling Device. J. Benn & Co., Oak Mills, Clayton, England, are placing on the market a spindle oiling device, the invention of Alfred Wallis, a workman in their employ. It is said that frames fitted with this spindle run for two or three weeks without a second oiling. It is also said to be smaller and so less oil is required. The device can be applied to roving as well as spinning frames.

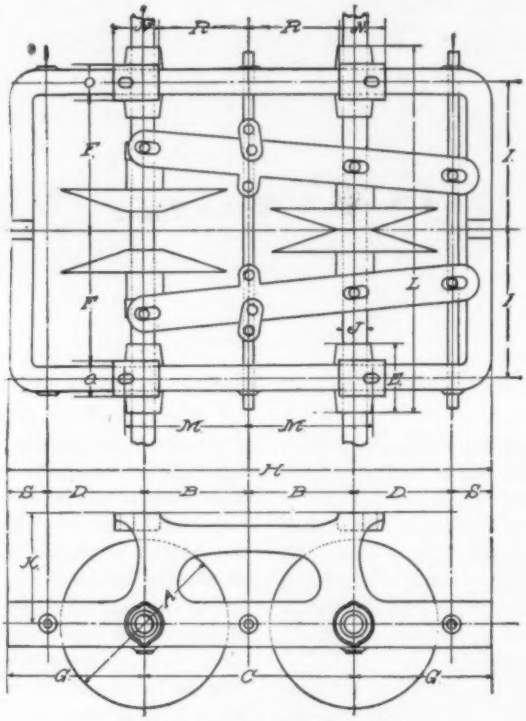
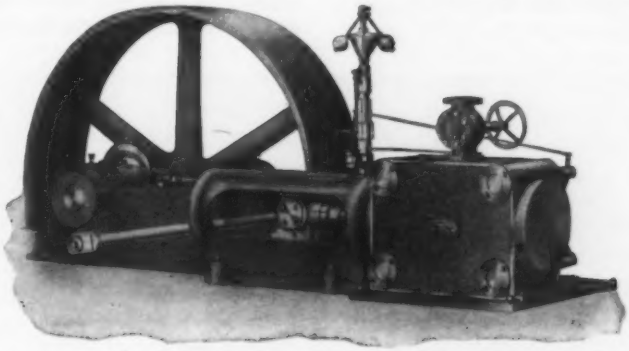


DIAGRAM OF THE REEVES PULLEY.

Cop Winding Attachment. F. A. Sattler, machine builder at Neukirchen, Saxony, is introducing a new cop winding device for winding yarn more solidly upon the cop.

ALLIS-CHALMERS COMPANY NEW STANDARD REYNOLDS CORLISS ENGINE.

We illustrate herewith a new Corliss engine which is being brought out by the Allis-Chalmers Company, Chicago, Ill., from the designs of Irving H. Reynolds. The field of Corliss engine design has been so fully worked over in the past, and the accepted designs have become so simple, that no strikingly novel designs are to be expected. The present machine, however, represents the experience of twenty-six years in building of Corliss engines, and combines all of the desirable elements of the best designs.



THE NEW STANDARD REYNOLDS CORLISS ENGINE.

Engines of the type illustrated are being built in seven sizes, ranging from 50 to 500 horse-power, and are designed for steam pressures up to 150 lbs. They are built of somewhat shorter strokes than have heretofore been customary in Corliss engines, with the idea of economizing in space and making the construction more rigid. The speeds are also somewhat higher than usual, ranging from 110 to 150 revolutions per minute, although these speeds are not higher than those at which the Reynolds-Corliss engines of older design are frequently operated.

The frame is cast in one piece with the slide, the construction being of the box type, resting on the foundation for its entire length. The main bearing shells are bored into the frame, thus insuring a solid bearing and also permitting the easy removal of the shells by rolling them out around the shaft.

The slide is of the barrel type with bored guides. The crosshead is fitted with babbitt faced shoes with wedge adjustment. The piston rod is screwed into the crosshead and held firmly with a steel lock nut. The cylinder is of the round cornered type, is fitted with double ported steam and exhaust valves, lagged with planished steel. The cylinder is set on a cast iron base plate, which extends under the valve gear, serving as a drip pan.

The valve gear is of the usual Reynolds Corliss type, the wrist plate being of skeleton pattern and fitted with a new type of disconnecting device which, while clamping the hook rod firmly, is very easily detached by hand. The dash pots are of differential plunger type without leathers or packing of any kind. The regulator is of the high speed weighted type, designed to control the engine within narrow limits of speed variation.

The connecting rod is of steel with solid forged ends, fitted with bronze boxes, babbitt lined on the crank pin ends, the boxes being adjustable by means of screw actuated wedges. The crank is of plain type, polished on the face, and is protected by a planished steel oil guard, not shown in cut.

The engines are fitted either with belt flywheels, as shown, or with square rim wheels where used with direct connected electric generators. The crank and crosshead pins and main journals are of a size ordinarily used with heavy duty engines. In brief, the engine is strong, simple and compact, and while nothing has been added for ornamentation, nothing contributing to economy or durability has been omitted, and the machine should find a large sale among power users who appreciate quality.

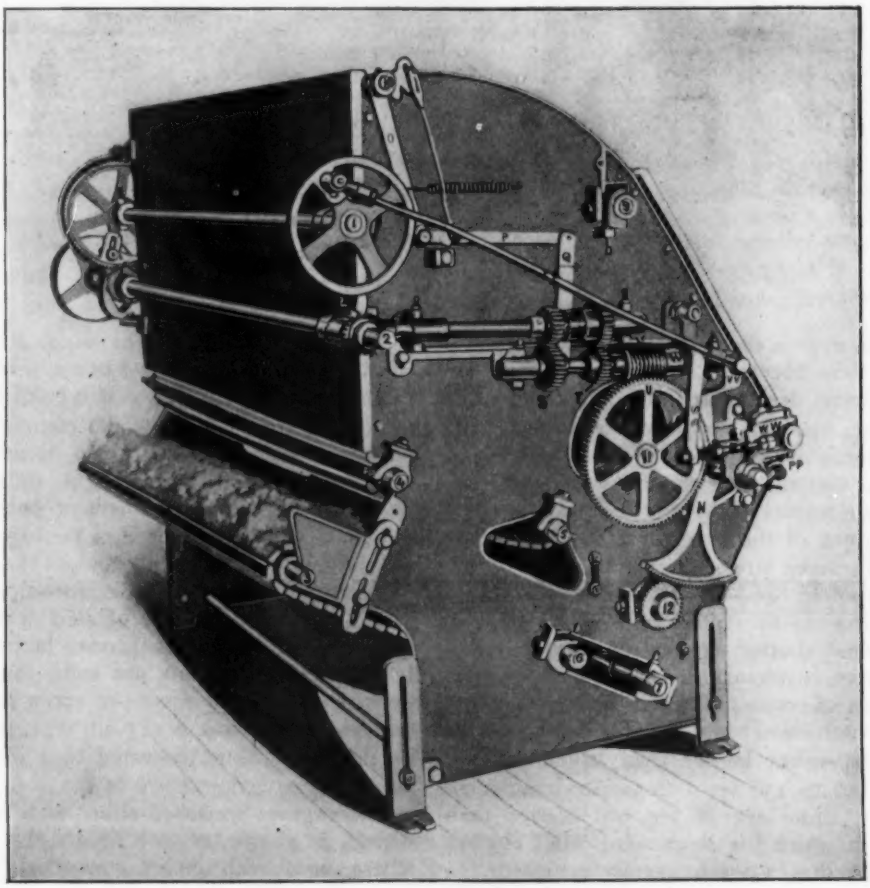
THE LATEST FISHER CARD FEED.

The illustration shows the latest model of Fisher card feed built by the Woonsocket Machine & Press Co., Woonsocket, R. I. The Fisher feed has been on the market for a number of years, and is in use in many of the leading mills in the country. The latest model, which embodies the improvements introduced in the last few years, is, we are informed, giving great satisfaction where it has been introduced.

Special points claimed are great evenness of feeding, whether long, short, coarse or fine stock is used, and the results are the same on wool, linen or worsted. It requires very little tending, the reservoir holding a larger quantity of stock. All parts are very easily adjusted.

One point upon which special stress is laid is that it feeds as evenly with the chamber nearly empty as when it is full.

It is stated by worsted mills where the Fisher feed has been used that the percentage of noils is largely reduced. The leading manufacturers who are using the Fisher feed endorse the claims of the builders.



THE FISHER CARD FEED.

The remuneration of ostrich feather workers is said to be larger than in any similar industry. The feathers pass through no less than eighteen processes before they become the tips and plumes of commerce. No machinery of any kind is used, the operations being entirely performed by hand.

THE HAHN AUTOMATIC MERCERIZING MACHINE.

A new machine for mercerizing yarn in the skein has recently been placed on the German market by the Niederlahnsteiner Maschinenfabrik, Niederlahnstein, Germany. We are told that it gives excellent results and a short description as given by the builders will therefore be of interest to our readers.

It is a double machine having a pair of feed rolls and two bowls. One of these bowls serves for impregnating the yarn with the alkali solution while the other is used for rinsing. The rinsing is effected by a strong spray of either warm or cold water coming from perforated pipes. The process is completely automatic. Only one attendant is required for the machine and he simply puts the yarn in position and removes the mercerized yarn. This he can easily do, as the delivery is so arranged that the yarn can be removed at irregular intervals. If the attendant is not at hand to remove the yarn when it is ready, it remains in position till he can find time to attend to it. It is said the operative is not required to give any attention to the mercerizing operations and that neither the quality nor quantity of the yarn depends in any degree upon his skill or attention. The movements of the machine are regulated very accurately so that every part of the yarn receives the same treatment. This results in a uniform and very silky lustre.

The breaking of the yarn is prevented by the use of the so-called spring tension by which the tension is automatically adjusted to the particular length of each skein. This, it is claimed, prevents any skein from being stretched more or less than another, a difficulty that is found in all machines that are positive in their motion. Frequently one skein will be slightly shorter than others. In such a case the positive motion results in a breaking of the yarn and a decreased lustre.

The production of the new machine is about 500 pounds in 10 hours, only one hand being required to tend the machine. The consumption of alkali is very small, amounting to but three-fourths to one pound of caustic for one pound of yarn. Only 1 H. P. is required for the operation of the machine. If these claims are well founded the Hahn machine is certainly very economical. The operation of the machine is described as follows: As soon as the skeins are laid on the machine the impregnation begins, one-half the skein being immersed in the liquor. The rolls now bring the yarn gradually under tension. The impregnation of the yarn is greatly assisted by the operation of the rubber squeeze rolls, which knead the liquor into the yarn. This is very important because frequently unmercerized spots are discovered in yarn mercerized on other machines, causing an irregularity in the color and lustre.

After the yarn is thoroughly impregnated the alkali tank is withdrawn and the rinsing tank takes its place. While this transfer is being made the surplus liquor in the yarn is thoroughly squeezed back into the alkali tub. This prevents any waste of alkali. Next comes the rinsing. First warm and then cold water is forced through the perforations in the pipe so that all the alkali is thoroughly removed from the material. After the yarn is again extracted the rollers approach each other, leaving the yarn in position to be removed by an attendant when he finds an opportunity. The process is then repeated. It is said that a number of mercerizing firms in Germany have thrown out their old mercerizing machines and replaced them with the Hahn machine just described.

The builders of this machine are also building a mercerizing machine for piece goods, likewise the invention of Herr Hahn. This machine is well spoken of, but it is the general opinion that a higher lustre can be obtained on goods mercerized in the yarn than in the piece.—Deutsche Faerber-Zeitung.

Electrical Card Cutting Machine. The Zerkowitz Inventions, Ltd., Bradford, England, have recently brought out an electrical jacquard card punching machine which is claimed to be a great improvement over the Vienna card cutting machine.

Cleaner for Mule Carriage. Theodor Elstner, Rudolfsthal, Reichenberg, Austria, is building a device for the automatic cleaning of the tops of mule carriages.

Dyeing, Bleaching, Printing, Etc.

OBSERVATIONS ON THE CAUSE OF LUSTRE ON MERCERIZED COTTON.

BY LOUIS J. MATOS, CHEMICAL ENGINEER.

The problem of determining the causes which influence the production of a permanent lustre on the cotton fibre during the time of its immersion in a moderately strong alkaline bath, and under tension, has by no means been completed, but the digest of the researches of Messrs. Huebner and Pope are to be regarded as being an important contribution to our present knowledge of the subject, and should stimulate further work along the lines laid out by these authors.

The internal action, however, of the alkaline bath upon the cellulose or fibre substance appears to be more or less a *terra incognita* to most investigators of this important technical process, and is due no doubt to the fact that the histological structure of the cotton fibre is not given proper consideration in connection with the alkaline liquors.

We cannot regard the cotton fibre as being composed entirely of pure cellulose, but rather as a composite filament, virtually made up of a succession of sheaths, one upon another, and each differing in chemical composition from the others. We are forced to believe this condition to be true, from a study of the action of various chemically different colors upon the pure fibre, when certain parts will be found to have a greater affinity for some colors than for others. Of course it is impossible to separate these several sheaths or coats, but their existence cannot be doubted.

The action of the alkaline solution upon the cotton fibre is peculiar, and may act upon the entire fibre substance, or upon one or more of the sheaths causing the straightening of the filament with the consequent untwisting of the convolutions characteristic of all cotton fibres.

As to the lustre upon the fibres, the writer believes it to be the result of a combined chemical and mechanical action, the latter dependent upon the former, and is to be explained in the following manner, and in conformity with the view above expressed regarding the structure of the cotton fibre: The alkaline solution acts upon one or more of the inner sheaths of the filament, forming a definite chemical compound—a soda-cellulose—or analogous body which, in the presence of the water of the bath, expands, at the same time stretching the outer coating or sheath, which, while in the stretched condition, imparts the lustre to the fibre in exactly the same manner that a sheet of ordinary pure rubber acquires a glossy surface when distended, and has greater refractive powers.

The underlying theory of this view of the mercerizing process is based upon the assumption that a definite chemical compound is formed with alkali from the bath on the one hand, and some of the fibre substance on the other, and that when later the fibre is well washed, a modified hydrocellulose remains, possessing all the qualities of the fibre, as when immersed in the alkaline bath.

That tension, during immersion, is an essential feature of the process goes without saying, as it is a well known fact that during the lateral expansion of the filaments there is a consequent longitudinal contraction which must be counteracted, and the only satisfactory means of accomplishing it is to apply tension in a direction opposite to the contractile force. Experiments in the mill have conclusively demonstrated that the lustre is in direct proportion to the tension up to the point of rupture of the cotton skeins. This latter fact points at once to the extreme difficulty of mercerizing warps by any continuous process or apparatus.

Regarding the microscopic cross-section of the cotton fibre after being mercerized loose and in the form of yarn under tension, the former is in nearly every instance circular and with the central lumen very much smaller, and frequently of irregular shape; on the other hand, the cross-section of the fibres from the mercerized yarn appear polygonal, and due to the pressure of each

fibre against its neighbors in the thread, while the outer ones only show signs of this pressing on the sides towards the centre of the thread. The characteristic of the central hole or lumen is, in many cases, quite distorted, thus indicating an expansion of fibre substance in two directions, towards the centre, and towards the circumference.

By the local application of a thickened alkaline solution to woven and thoroughly cleansed cotton fabrics, as in the production of "crimped" effects, quite popular for ladies' shirtwaists a few years ago, the portion of the fabric acted upon is truly mercerized from the chemical standpoint, but is quite devoid of lustre, the result of there being no means of giving the required tension to the goods under treatment.

That a chemical change has taken place in the cotton fibre after treatment with the alkali is at once apparent to any person who has had experience in dyeing mercerized cotton; it is found that the dyestuffs of the tetrazo group are taken up from their bath, in many instances from a cold bath, in from one-quarter to one-half the time usually taken for dyeing, a degree of rapidity, coupled with a degree of affinity for the color base, that has given many dyers considerable trouble in attempting to rectify uneven shades.

The modified condition of mercerized cotton is also to be noticed in its deportment toward many of the azo coloring matters that are used for wool dyeing, and which do not stain ordinary cotton, a desirable quality for manufacturers of certain lines of mixed goods; but when mercerized cotton threads are substituted for plain cotton, it is found that they stained to such an extent as to preclude their use.

That the mercerizing process is virtually a chemical one may be further considered when we consider the action of pure tannin solutions upon both plain and mercerized cotton; the former have the property of taking up in a given time, and under the same conditions, a greater amount of tannin than the latter, indicating that the tannin absorbing factor for cotton is lowered by the alkaline treatment.

On the other hand, however, it cannot be denied but that the cotton to be mercerized or "lustred" must be subjected to certain mechanical influences—must be brought to the state of complete tension and kept in such a state during the alkaline treatment; otherwise no lustre will develop, although all the other necessary elements of the process may be present.

The writer believes that while a great deal has been and is now being done along the line of the chemical and mechanical study of the various details of the process, yet a truer solution of the problem will be reached by an investigation from a chemico-botanical point of view, keeping in mind that a single cotton fibre is but an elongated plant cell, having all the attributes of a plant cell, both as regards its structure and contents, and that its ultimate composition can only be the sum of the chemical constituents of its several elemental structures, the presence of which we cannot ignore, if we give due regard to the function played by living protoplasm (the contents of a healthy plant cell), in depositing or causing to be deposited certain coatings within the cell as it grows and reaches maturity.

There can be no doubt but that the cotton fibre, viewed from the standpoint of histological botany, and at the same time studied chemically, will eliminate many of the theories of the mercerizing process.

STEAM BLACKS.

Although many processes are given for making these useful colors not all are by any means as easy as one is led to believe from a simple reading of the formula. The following processes are typical of the several groups of steam blacks now used for cotton work, and when prepared carefully will give good results. In order to make these colors at the lowest cost and in a satisfactory manner requires that the shop be fitted up with steam jacketted kettle or trunnions, and provided with mechanical stirrers.

STEAM BLACK A C.

Logwood extract, solid	50 lbs.
Water	6 gal.
Glycerine	25 lbs.

Mix and heat to 180° F., then add a mixture of

Chrome alum	15 lbs.
Bichromate of sodium	8 lbs.
Water	6 gal.

Mix and when cold add

Muriatic acid	1 gal.

Boil for one-half hour, cool and keep for use. It will be found that by keeping this product in storage for two to four weeks to "age" it will yield much handsomer blacks than if used when freshly prepared.

STEAM BLACK J (JET SHADE).

Dextrine	1½ lbs.
Starch	2 lbs.
Bark extract	¾ lb.
Water	½ gal.
Acetic acid	4 lbs.
Olive oil	3 ozs.
Logwood extract, 51°	4 lbs.
Turpentine	4½ ozs.

Boil thoroughly together and add

Chlorate of potash	4 ozs.
Chromium acetate	4 lbs.

Should a blue shade of black be desired, this same mixture will answer, but a small addition of ferrocyanide of potassium must be added.

What is known to European printers as

NOIR REDUIT

is as follows:

Bichromate of potash	6 lbs.
Hot acetic acid	4 gal.
Logwood extract, 51°	60 lbs.

stir well and add

Bisulphite of soda solution, 71° Tw.	30 lbs.

Heat to near the boil, when the precipitate which forms redissolves, then starch paste is added to impart proper consistency for printing.

Various salts are added to modify the shade, thus:

Bleach iron liquor	Brownish
Chromium acetate	Bluish

ANILINE BLACK.

Starch	7 ozs.
Water	½ gal.
Chlorate of potash	1¼ ozs.

Dissolve and add

Aniline oil	4 ozs.
Hydrochloric acid	4 ozs.

Incorporate well and just before using on the printing machine add

Green paste	4 ozs.

Print and give a thorough ageing.

Green paste is the common name for sulphide of copper in paste form. This article may be purchased in the market, but better satisfaction will always be secured if it is made every few days and therefore used fresh. It is made by precipitating a solution of bluestone with sulphide of sodium, allowing to settle, decant and wash once, then filter through cloths. Draining for 12 hours yields a 50 per cent. paste.

BLACK LAKE PRINTING PASTE.

An aniline lake is prepared by precipitating aniline oil with bichromate of sodium, and after washing and draining is made into a paste with water. In reality it is only a pigment process, as the color is fixed on the fabric by means of albumen. The proportions are:

Aniline precipitate	3 lbs.
Albumen solution (1:1)	4 lbs.
Chlorate of sodium	1 oz.

The subsequent steaming coagulates the albumen and consequently "fixes" the black.

There is no doubt that the steam blacks made with logwood are the easiest to manipulate, and in the long run are the most satisfactory, as they yield the bloomiest blacks. Of course the better the grade of logwood used, the richer the results, while the acme of perfection will always be attained by using hematine.

In the cotton cloth factories in the departments of the Rhone and the Loire in France, early closing on Saturdays has been practiced since 1899.

THE DYEING OF SATINS.

For a long time satins have been held in high esteem on account of their many good qualities for purposes of dress, while their very good points are specially recognized in their being selected as the fabrics best suited for the finishing of outer garments of all kinds, whether for men or women. Renewed activity being displayed by manufacturers of cotton and silk satins, it may be well to give some attention to the current methods of dyeing these goods.

The goods should be clean and free from all dirt whether due to the silk or cotton, and for the very best effects the cotton should be bleached before dyeing, as it will very materially assist in giving a bright shade to the fabric.

We prefer the use of the direct colors, as with them the dyer is enabled to control his dyebath and results much better than with any other class of colors, and should it be necessary afterwards to tone or shade the silk by other kinds of dyestuffs, it is very easy to do so, as the direct dyes have, to a slight extent, the property of taking up small amounts of other dyes, thereby producing a very good range of supplementary shades.

The direct dyes, on the other hand, do not require special assistance in dyeing. For ordinary purposes it is quite sufficient to add to the dyebath only common soap and phosphate, a small quantity of soda to make the bath alkaline, and common salt to raise the density of the bath and force the color on the fibres.

Of course if too much of the above articles are added to the dyebath, it will exhaust almost completely, even to the extent of causing the dyed shades to be uneven. If an excess of soap is added to the bath and the proportion of salt reduced, the tendency is to prevent the dye from going on the fibres. This gives lighter shades as a result, consequently the dyer has at his command a ready and cheap means of preventing heavy shades.

As no hard and fast rule can be laid down for this class of work, the following general particulars may be used as a guide; they are based upon practical experience and will result in satisfaction. The proportions are based upon the volume of the dyebath, rather than on the quantity of goods to be dyed, and also regulating the proportions to the relative depth of shade.

Dark shades: For each 10 gallons of liquor.

Soap	5 to 6 oz.
Soda	½ oz.
Phosphate of soda	5 to 6 oz.
Calcined Glaubersalt	3 to 6 oz.

Light shades: For each 10 gallons of liquor.

Soap	2 to 5 oz.
Soda	¼ to ½ oz.

or, the same formula as above with the addition of phosphate of soda, 3 to 5 oz.

The best results in dyeing with the direct colors and the above formulae, is to enter the goods at a temperature about 140 deg. F., and gradually increase it to 180 to 195 deg. while allowing it to come to the actual boil once before allowing the goods to cool down.

As the baths do not exhaust completely, the usual proportional additions must be made for subsequent lots—as a rule three-fourths of the dye is taken up, and only one-fourth to one-fifth of the other ingredients.

In dyeing a series of shades of one color, say steels or drabs, browns or other colors, always work from the heaviest shades, ending with the lightest. By this means the various component colors of the bath may be utilized without waste. Finishing the dyed pieces is generally done with a thorough rinse with water, and brightened with a small quantity of acetic acid—say one pint to each ten gallons of water.

As in every other kind of dyeing, the best and brightest shades can only be produced upon the cleanest stock—preferably bleached—and then when dyed in water that has been previously purified.

Cotton was first cultivated in America by some Virginian colonists in 1621 as an experiment. In 1784 eight bags were shipped from Charleston to Liverpool.

THE PROBLEM OF SILK WEIGHTING

It is not the purpose of the present article to discuss the relative merits of the arguments for and against the practice of artificially weighting silk, but to direct attention to the several important processes made use of for that purpose.

The commercial aspect of silk weighting is at present a very important one. So important, indeed, is it that, in the computations of cost and sales prices of the merchantable article, much depends upon the ability of the dyer, or whoever attends to the weighting, to put on the maximum that the particular grade of goods will bear, and it is needless to observe that the more successful —from a technical point of view—a dyer is along these lines, the more valuable he is to his employers.

The practice of silk weighting originated many years ago when competition in silk manufacturing first became defined and it was necessary for the dyer to account for every ounce of silk delivered. Prior to this period, it was the pride of competing silk manufacturers to vie with one another in putting upon the market silks that were noted for their purity and excellence of feel and lustre. Gradually the original standards were departed from, until today there are as many grades of fabrics as there are manufacturers, and the differences are not so much in the kind of silk or silk threads used as in the kind and character of weighting and finish—which latter also plays a most important part in silks of the period.

Raw silks, as a general rule, contain about 20 to 25 per cent. of gum which, wholly or partially, is removed from the silk in the processes preparatory to bleaching or dyeing. This loss must be made up by the addition to the silk of some substance that will in no way materially interfere with the working qualities of the fibres, or impair its lustre or strength, consequently it is seen at once that weighting is no small matter. If the problem began and ended with the original weight of the silk being restored to the normal it would not be so serious, but when manufacturers found that the normal could be given, then the demand came to the dyers for silk weighted above normal (pari), and the result is that today we find silk goods carrying as much as 200 per cent. (36 ounces) and even more.

To make this point clear the designation of weighted silks starts from normal—called pari,—that is, the original weight of the silk as delivered to the dyer, thus, 100 pounds of silk are delivered for weighting and dyeing (we can disregard the weight added in dyeing as it is trifling). After it is boiled off and dried it will be found to weigh say 75 pounds, showing thereby a loss of 25 pounds, which must be added by "weighting" to bring it up to pari, or 4 ounces must be added to every 12 ounces of clean silk, the result being 16 ounces in every pound returned by the dyer. If, on the other hand, an excess of 4 ounces is added, say 6 ounces, the result is an "18 ounce," or as commercially designated, 16/18 ounce silk. If "22/24 ounce" silk is wanted, the dyer will be required to add to every 12 ounces of clean silk, 10 to 12 ounces of weighting—or roughly, 100 per cent. of the net weight.

The processes of giving added weight to silk are legion, but in practice only a few can be used to advantage, the most important being that based upon the use of stannic chloride, and popularly termed "dynamiting." Many modifications of this process are in use, the foundation of all being the following: The boiled-off silk is allowed to remain immersed for about one hour in a solution of stannic chloride standing at 50 deg. Tw., when it is lifted, drained, squeezed thoroughly so as to remove as much of the excess tin solution as possible, then washed in water, squeezed again, and passed for about 15 minutes through a boiling bath of phosphate of sodium, standing when cold at 50 deg. Tw. The silk is now washed, and passed through a solution of sulphate of alumina standing at 7 deg. Tw. for 10 or 15 minutes, and followed by a passage through a bath of silicate of soda at 7 deg. Tw. This final bath may be warm. This treatment in its entirety is repeated as often as necessary to give the desired increase of weight, for it is quite manifest that one passage would hardly give the frequently excessive weight-

ings desired. After the proper number of treatments, the silk is finished by working in a warm soap bath for a few minutes to give the soft "silky" feel.

For light colored or white goods, this weighting is essential, as most other processes impart a certain amount of color to the goods. Stannic chloride is, of all other weighting solutions, the one having least action on the natural lustre of the silk, but it does have a more or less injurious action on many colors dyed upon it, and, to some extent, upon the strength of the fabric.

Next to tin weighting, and of gradually increasing importance, is the use of albuminous substances such as glue, gelatine, etc. It has the special advantage of causing the fibres to "fill up" and at the same time add to the lustre, without in the least impairing the strength, while this treatment permits of a supplementary weighting if it is desired. The increase in weight, too, is rational, and without going to extremes, it may be pushed to 50 per cent. (18 ounces) without any trouble. Three processes will be given, the first with albumen.

Prepare a solution of 10 ounces blood albumen in 1 1/2 gallons water; when solution is complete, dilute with 1 1/2 gallons water and add 3 ounces of a 40 per cent. solution of formaldehyde. The silk being previously boiled-off and wrung out, is immersed for 1 to 1 1/2 hours in the above solution, lifted, wrung out, again immersed for the same period, lifted, wrung out and air dried, finished in the usual manner, and then flue dried. These two treatments will add about 30 per cent.

CASEIN (SKIMMED MILK REFUSE) AND ALBUMEN WEIGHTING.

One pound of casein is made into a paste with 1 gallon of water, to which is added a solution of 1 1/2 ounces borax in 1/2 gallon water. Let stand for 12 hours. Now add 1 pint of a 10 per cent. solution of albumen in water, and 3 ounces of 40 per cent. formaldehyde in 1/2 gallon of water. The silk is immersed three or four times in this solution, each immersion being for about one hour, lifted and finished as under the previous process. This gives an added weight of 40 to 45 per cent.

The gelatine and albumen process is similar to the above. Dissolve one pound of gelatine first by soaking, and afterwards by boiling in 1 1/4 gallons of water, cool and add 1 pint of a 10 per cent. solution of albumen with 3 ozs. 40 per cent. formaldehyde in 1/2 gallon water. The weighting is effected by hour immersions, and four or five will be found quite sufficient to add 50 per cent. to the weight of the silk.

Silk weighted as above is well adapted for dyeing with the basic colors, and with the acid colors—if the usual caution is taken to add the dye solution gradually to the dye bath.

(To be continued.)

Khaki on Cotton and Other Textile Material; Dr. Friedrich Carl Theis; M. Krayn, Berlin; price $3.00.

This is the English translation of a German work to which we called attention some months ago. The Transvaal and Chinese wars created a brisk demand for khaki material for military purposes. This color has not proved popular for general use and the return of peace has been followed by a great falling off in the demand for the goods. Khaki, however, on account of its peculiar qualities, will doubtless continue to be used for military purposes. Manufacturers who propose to make these goods must be prepared to meet sharp competition, and, therefore, should be furnished with the best processes for producing a high grade of goods at the lowest possible cost. It is for this reason that the present monograph on the coloring of khaki will prove valuable to many of our textile manufacturers. The work is illustrated with samples of the goods and the author has aimed to present only the best and most approved processes for applying this color to different textile materials.

New Color Cards.

Pluto Black A F and C F Extra; Farbenfabriken of Elberfeld Co., 40 Stone St., New York City.

A card showing black colored with Pluto Black on cotton yarn and half-wool cloth.

Diazo Fast Black S D and B Z; Farbenfabriken of Elberfeld Co., 40 Stone St., New York City.

This card shows a black dyed with the above named dyes on cotton yarn, cotton cloth, silk waste and half-silk cloth.

Benzo Violet R L Extra; Farbenfabriken of Elberfeld Co., 40 Stone St., New York City.

This card shows samples of cotton yarn, cotton cloth and half-silk cloth dyed with Benzo Violet R L.

Level Dyeing Colors; Farbenfabriken of Elberfeld Co., 40 Stone St., New York City.

This is an elaborate card showing 85 styles of ladies' Paris dress goods in all the prevailing shades. A copy of this card should be in the hands of every manufacturer of dress fabrics.

Diamond Black; Farbenfabriken of Elberfeld Co., 40 Stone St., New York City.

This card shows black on worsted yarn, cloth and top colored with Diamond Black P V B, which gives a shade closely resembling that of logwood.

Anthracene Yellow; Farbenfabriken of Elberfeld Co., 40 Stone St., New York City.

Four shades of yellow on worsted yarn dyed with Anthracene Yellow C.

Katigen Blue Black; Farbenfabriken of Elberfeld Co., 40 Stone St., New York City.

Two samples of worsted yarn colored black with Katigen Blue Black B extra.

Fashionable Shades; Cassella Color Co., 182 Front St., New York City.

This is an elaborate card showing 226 different shades of woolen cloth dyed with easily leveling dyestuffs.

Paranitraniline Red; Farbenfabriken of Elberfeld Co., 40 Stone St., New York City.

This is a pamphlet describing the coloring of cotton yarn with Paranitraniline Red. It describes the chemicals employed and previous treatment of the yarn, mordanting with Beta Naphthol, diazotizing, the development of the fibre and the final treatment of the dyed yarn. It includes special directions for the use of Paranitraniline S and Paranitraniline Base. There is also a table given which shows the specific gravity and density by the Baume hydrometer for different solutions of acids.

Sulphur Dyes on Raw Cotton; Berlin Aniline Works, 213 Water St., New York City.

A case containing fifty-four samples of raw cotton dyed with the sulphur colors, for each of which a formula and full dyeing directions are given.

Azo Merino Blue, Cassella Color Co., 182 Front St., New York City.

This card shows eleven samples of piece goods dyed with Azo Merino Blue. A number of the samples have a cotton striping thread which remains unaffected by the dyeing process that colored the wool.

Dyeing on Mercerized Linings with Silk Effects; Cassella Color Co., 182 Front St., New York City.

A card showing twenty-four samples of linings with silk effects. Full directions are given for dyeing the same.

Azo Wool Blue; Cassella Color Co., 182 Front St., New York City.

Six samples showing colors dyed with Azo Blue S E on worsted yarn and piece goods.

DYE RECIPES.

The following recipes appear in the Dyers' Supplement, which is issued each month by the TEXTILE WORLD RECORD. The Supplement contains the colored samples, dyed according to recipes giv n. The selection of samples is carefully made, and it is the aim to show shades which are of especial interest to the dyer, and which the requirements of the market demand. The Dyers' Supplement is a 16-page pamphlet, in convenient form for preservation Subscription price for the Dyers' Supplement $1.00 per year

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Recipe No. 177.

Yellow on Cotton Yarn.

Chlorozol Yellow Y on 100 lbs. cotton yarn. Prepare the dye bath with

2 lbs. Chlorozol Yellow Y.
(Read, Holliday & Sons, Ltd., 7 Platt St., New York City.)
25 lbs. Common Salt.

Chlorozol Yellow Y is a direct cotton color and gives an excellent shade.

Recipe No. 178.

Brown on Worsted Yarn.

Domingo Chrome Brown G on 100 lbs. worsted yarn. Prepare the dye bath with

3 lbs. Domingo Chrome Brown G.
(C. Bischoff & Co., 88 Park Pl., New York.)
4 lbs. Sulphuric Acid.
15 lbs. Glauber's Salt.

Enter at 180° F., bring to a boil and dye for one hour, exhausting the dye bath.

When dye bath is exhausted add

3 lbs. Potassium Dichromate

and after treat for one-half hour at a boil.

Domingo Chrome Brown G dyes evenly and produces an excellent shade of reddish brown. It possesses the common properties of the acid dyestuffs.

Recipe No. 179.

Blue on Cotton Yarn.

Pyrogen Indigo on 100 lbs. cotton yarn. Prepare the dye bath with

10 lbs. Pyrogen Indigo.
(A. Klipstein & Co., 122 Pearl St., New York.)
12 lbs. Sodium Sulphide.
10 lbs. Soda Ash.
30 lbs. Common Salt.

Enter yarn at 160° F., raise to 195°-200° and dye one hour. Keep yarn below surface of liquor, squeeze and expose to air fifteen minutes, then rinse well, and finish, as usual.

Where special fastness to rubbing is required the following finish may be used to advantage:

2 lbs. Soft Paraffin.
2 lbs. Glue.
1 to 2 lbs. Dextrine.

Work 15 minutes at 105°-120° F., squeeze and dry.

Pyrogen Indigo gives excellent and fast shades of blue very much resembling those produced by indigo.

Recipe No. 180.

Green on Worsted Yarn.

Milling Green B on 100 lbs. worsted yarn. Prepare the dye bath with

2 lbs. Milling Green B.
(New York & Boston Dyewood Co., 156 William St., New York.)
4 lbs. Sulphuric Acid.
20 lbs. Glauber's Salt.

Enter at 100° F., raise slowly to a boil and boil one hour, or until finished.

Milling Green B is excellently suited to the dyeing of carpet yarns. It dyes very evenly and possesses very good fastness to light.

Recipe No. 181.

Black on Cotton Yarn.

Katigen Blue Black B on 100 lbs. cotton yarn. Prepare the dye bath with

20 lbs. Katigen Blue Black B.
(Farbenfabriken of Elberfeld Co., 40 Stone St., New York.)
20 lbs. Sodium Sulphide Crystals.
8 lbs. Soda Ash.
50 lbs. Glauber's Salt.

Boil the dye bath to ensure complete solution of ingredients, drop temperature just below boil, enter yarn and dye at this temperature for one hour.

After treat in a bath made up with

3 lbs. Potassium Dichromate.
3 lbs. Copper Sulphate.
5 lbs. Acetic Acid

for one-half hour at a temperature of 165° F.

Katigen Blue Black B possesses excellent fastness, and dyes very level.

Recipe No. 182.

Blue on Worsted Yarn.

Wool Blue 5 B on 100 lbs. worsted yarn. Prepare the dye bath with

1½ lbs. Wool Blue 5 B.
(Berlin Aniline Works, 213-215 Water St., New York.)
20 lbs. Glauber's Salt.

Enter at 160° F., bring to a boil and dye at a boiling temperature for one hour.

Wool Blue 5 B gives a very clear shade of blue tending toward the green. It is very useful in the dyeing of union goods. It leaves cotton undyed, and is splendidly suitable for combinations with substantive coloring matters employed for union goods.

Recipe No. 183.

Black on Worsted Yarn.

Acid Black J on 100 lbs. worsted yarn. Prepare the dye bath with

4 lbs. Acid Black J.
(New York & Boston Dyewood Co., 156 William St., New York.)
4 lbs. Sulphuric Acid.
15 lbs. Glauber's Salt.

Enter at 180° F., bring to a boil and dye at a boiling temperature for one hour.

Acid Black J has good coloring power and possesses good fastness.

Recipe No. 184.

Brown on Cotton Yarn.

Thiogen Brown G R on 100 lbs. cotton yarn. Prepare the dye bath with

10 lbs. Thiogen Brown G R.
(H. A. Metz & Co., 122 Hudson St., New York.)
5 lbs. Sodium Sulphide (crys.).
3 lbs. Soda Ash.
30 lbs. Common Salt.

Dye one hour at a temperature of from 175° to 195° F., rinse well and dry.

Thiogen Brown G R requires no after treatment as the direct shades are very fast. The after treated shade is some faster, however. The dyestuff is very soluble and therefore suitable for mechanical apparatus.

Recipe No. 185.

Blue on Carpet Yarn.

Blue 3 M on 100 lbs. carpet yarn. Prepare the dye bath with

2 lbs. Soluble Blue 3 M.
(Read, Holliday & Sons, Ltd., 7 Platt St., New York City.)
10 lbs. Glaubersalt.
4 lbs. Sulphuric Acid.

Blue 3 M is an acid color and produces a fast and excellent shade.

Recipe No. 186.

Blue on Cotton Yarn.

Immedial Indone 3 B conc. on 100 lbs. cotton yarn. Prepare the dye bath with

16 lbs. Immedial Indone 3 B conc.
(Cassella Color Co., 182 Front St., New York.)
30 lbs. Sodium Sulphide Crystals.
8 lbs. Soda Ash.
16 lbs. Glucose.
20 lbs. Common Salt,

using about 2 gallons of water for every pound of yarn dyed.

It is best to dye on bent iron rods for one hour at about 120° F., then to squeeze off well and to level by wringing rapidly. It is essential to squeeze carefully and wring evenly for the production of even shades. After dyeing, the yarn is allowed to hang in the air ½ to 1 hour.

For subsequent lots, if the same bath is used, it is only necessary to strengthen the bath by the following additions:

8 lbs. 6½ oz. Immedial Indone 3 B conc.
17 lbs. Sodium Sulphide Crystals.
2 lbs. Soda Ash.
6 lbs. Glucose.

Immedial Indone 3 B conc. is extremely fast to light, washing, crocking and cross dyeing.

Recipe No. 187.

Brown on Cotton Yarn.

Triazol Brown B G on 100 lbs. cotton yarn. Prepare the dye bath with

2 lbs. Triazol Brown B G.
(Geisenheimer & Co., 189 Front St., New York.)
20 lbs. Glauber's Salt.
2 lbs. Soda Ash.

Enter yarn at 160° F., bring to a boil and dye at a boiling temperature for one hour. Triazol Brown B G possesses the characteristic properties of the direct cotton colors, and its fastness to light, soaping and washing are fairly good.

Recipe No. 188.

Black on Cotton Yarn.

Phenedine Fast Black H B on 100 lbs. cotton yarn. Prepare the dye bath with

7 lbs. Phenedine Fast Black H B.
(Sykes & Street, 85 Water St., New York.)
30 lbs. Common Salt.

Enter at 170° F., bring to a boil and dye at a boiling temperature for one hour. Then diazotize in a cold bath made up with

2½ lbs. Sodium Nitrite.
7½ lbs. Muriatic Acid.

Work in this bath ½ hour, and then develop for ½ hour in a cold bath containing

1 lb. Developer T D.
Necessary Cold Water,

rinse and dry.

Phenedine Fast Black H B gives an excellent shade of black, possessing the fastness of the developed direct cotton colors.

Recipe No. 189.

Green on Cotton Yarn.

Dianol Green 2 B on 100 lbs. cotton yarn. Prepare the dye bath with

3 lbs. Dianol Green 2 B.
(Thos. Leyland & Co., 53 India St., Boston.)
30 lbs. Common Salt.

Enter at 180° F., bring to a boil and dye at a boiling temperature for one hour.

Dianol Green 2 B produces an exceptionally bright shade of green for a direct cotton color. It dyes level and compares favorably with other direct colors as to fastness.

Recipe No. 190.

Yellow on Worsted Yarn.

Chrome Yellow J on 100 lbs. worsted yarn. Prepare the dye bath with

3 lbs. Chrome Yellow J.
(Sykes & Street, 85 Water St., New York.)
3 lbs. Acetic Acid.
1½ lbs. Potassium Dichromate.

Enter the previously well cleaned yarn without previous mordanting and dye at a boil until the bath is exhausted, which will take about one hour. After this continue the boiling twenty minutes to insure complete fixation of the color.

Chrome Yellow J gives a very bright and very fast shade of yellow. The great advantages of this dyestuff are the obtaining of fast shades without any previous mordanting or separate after treatment, and that direct additions may be made to the dye bath without cooling it down.

Recipe No. 191.

Blue on Worsted Yarn.

Fast Acid Blue No. 3169 on 100 lbs. worsted yarn. Prepare the dye bath with

3 lbs. Fast Acid Blue No. 3169.
(F. E. Atteaux & Co., 176 Purchase St., Boston.)
5 lbs. Sulphuric Acid.
20 lbs. Glauber's Salt.

Enter yarn at 170° and dye at a boil to exhaust. It is better to add the acid gradually rather than all at one time.

Fast Acid Blue No. 3169 gives an excellent shade of blue, possessing very good fastness.

Recipe No. 192.

Yellow on Cotton Yarn.

Fast Yellow G upon 100 lbs. cotton yarn. Prepare the dye bath with

3 lbs. Fast Yellow G.
(E. M. Thayer & Co., 106-112 Broad St., Boston.)
10 lbs. Common Salt.
2½ lbs. Sodium Phosphate.

Enter at a boil and dye at a boiling temperature for one hour.

Fast Yellow G is very fast to light.

Mill News.

COTTON.

New Mills.

*Alabama, Huntsville. Operations will be started this month by the Madison Mfg. Co., capitalized at $300,000. They will make twills, sateens and print cloths, operating 16,000 ring spindles and 500 looms. Capt. Milton Hussies is president of the company; C. C. Harris (Decatur, Ala.), treasurer; A. F. Knight (formerly of Providence, R. I.), general manager, and W. B. Knight, superintendent. Steam power will be used.

*Georgia, Cartersville. Work is progressing on the new plant for the American Pad & Textile Co., successors to the E. L. McClain Manufacturing Co. This plant will be equipped with 25,000 spindles and 375 looms, for making cloth used in making pads for horses.

*Indiana, Evansville. The Lincoln Cotton Mill Co. contemplates starting up about December, with 16,000 ring spindles and 500 looms. W. H. Grammer is superintendent of the mill; William Callflesh, overseer of weaving; Chas. Rodey, spinning, and A. R. Ennis, carding.

*Maryland, Bank. The Baldwin Mfg. Co., which has recently been incorporated, has purchased the machinery for their new mill. They will manufacture tapestry piece goods, curtains and couch covers.

*Massachusetts, Fall River. All the machinery in the Davis Mill is practically in operation now with the exception of about 200 looms, but it is thought that the plant will be running in full by the first of December.

*Massachusetts, Fall River. Plans and specifications have been completed for the new plant of the Watuppa Mills and contracts will be let shortly. The main building will be 212 by 156 feet, two stories, with saw tooth roof, with power house, 48 by 20 feet. Plant will be equipped with about 600 looms for making fancy cotton fabrics and cotton mixed with silk, linen, mercerized or polished yarns, all kinds of cotton dress goods, vestings, shirt waistings, etc.

Massachusetts, Holyoke. The Bullard Thread Co. has been organized with capital stock of $20,000, by W. H. Bullard, D. H. Ives, C. W. Johnson, et al. The purpose of the company is to manufacture thread. Efforts are being made to absorb either or both of the following companies, the Holyoke Thread Co. and the Cressy Thread Co. A. A. Coburn is president of the company and W. H. Bullard, treasurer.

*Massachusetts, New Bedford. Edgar Harding is president of the Manomet Mills, reported incorporated with capital stock of $800,000; A. C. Gardner, treasurer, and Chas. M. Holmes, agent. E. M. Cushman will be superintendent of the plant, which will be operated on combed hosiery yarns. It is expected to have the plant, now under construction, completed by April 1st. Will install 55,000 mule spindles and employ about 600 people. Harding, Whitman & Co., 78 Chauncy St., Boston, will be the selling agents.

*Massachusetts, Northbridge. Ground has been broken for the new cotton mill to be erected by the Whitin Mfg. Co.

New Hampshire, Claremont. The Royal Textile Company, reported at New York, is located in the old Bailey Mill, manufacturing shoe and corset lacings. D. G. Sunderland is resident manager of the concern.

*North Carolina, Augusta. The mill in which J. D. Hodges has been reported interested is located here and not at Georgia. The buildings have been completed, but owing to the uncertain condition of the cotton market, parties have decided to wait before purchasing any of the equipment.

North Carolina, Drexel. The Drexel Spinning Co. has been incorporated, with R. B. Mull president and J. S. Abernathy, treasurer, to manufacture 30 to 60 yarns.

*North Carolina, Greensboro. The new concern in which W. I. Young has been reported interested, will establish a plant with 15,000 mule and 5,000 ring spindles, with full complement of weaving of both plain and dobbies, and dyeing and finishing outfit. About $500,000 to $600,000 will be represented in the investment. It will be about 30 days before plans and specifications have been completed, after which bids will be asked for the necessary equipment.

*North Carolina, Marshall. Mr. H. H. Pottle of New York, who is backing the enterprise of the Capitola Mfg. Co., will be in Boston for a few days in regard to the purchasing of the machinery for the company. He will make his headquarters, for the next few days, at the offices of the Consulting Engineer, Adolph Suck, 179 Summer Street, Boston, Mass.

*North Carolina, Spray. The Rhode Island Co., reported in a previous issue as capitalized at $125,000, contemplates starting manufacture of yarns, number 30s, about December 1st. They will operate 5,376 spindles (ring). B. Frank Mebane is president of the concern; W. R. Walker, treasurer, and L. McRay, superintendent. They will use steam power. J. H. Parvin & Co., Philadelphia, will be the selling agents.

Pennsylvania, Philadelphia. Stern & Bond, are manufacturing gimps at the corner of Waterloo & York streets, using 30 gimp machines in their operations. Mr. Edwin L. Taynton is the superintendent and the main office is at 1033 Chestnut street.

*Pennsylvania, Wilkes-Barre. The Wilkes-Barre and Wyoming Valley Lace Mfg. Co., recently reported organized, will start building operations as soon as capital is all subscribed. This is the plant in which W. C. A. Banfield is interested and of which he will be superintendent. Nottingham lace curtains will be made, operating twelve looms and twenty-four sewing machines. A dye house will be

attached to the mill, which is to be operated by steam power.

*Rhode Island, North Smithfield. Work is progressing on the new mill for the Blackstone Manufacturing Co., of Blackstone, Mass. The second story is half completed and it is thought the entire plant will be finished by March, 1904. Some of the new looms (about 30) are reported in operation in the old mill, so as to be in good running order when the new plant is ready.

*South Carolina, Anderson. The cotton mill to be started here by the Anderson Phosphate & Oil Co., will be operated as the Conneross Yarn Mill. Cotton yarns will be made in addition to rope.

*South Carolina, Liberty. The Calumet Manufacturing Co., reported incorporated with capital stock of $50,000, has decided to increase the capital stock to $100,000 and this will delay somewhat in making preparatory plans. They expect to be ready to begin definite work about December 1st.

Enlargements and Improvements.

Alabama, Girard. It is reported that the Girard Cotton Mills will build an addition to the mill and install 20 more looms.

Huntsville, Ala. The Merrimack Manufacturing Company are equipping their No. 2 Mill throughout with the American Moistening Company's system of humidifiers.

Connecticut, Sandy Hook. The Fabric Fire Hose Co. is installing in the lower mill an electric lighting plant with capacity of 1,200 lights for illuminating purposes.

Connecticut, Vernon. An addition is being built to the Ravine Mills, in which the beaming room will be installed. Twisters will be placed in the room formerly used for beaming.

Connecticut, Waterbury. Contract has been let by the American Mills Co. for the erection of an addition, 28 by 77 feet, two stories and basement.

Georgia, Columbus. The Eagle & Phoenix Mills will install about $15,000 worth of new machinery in the carding, picking and spinning departments of No. 3 mill. They will also add one set woolen cards, 672 spindles and 16 woolen looms.

Georgia, Dublin. The Dublin Cotton Mills are to install additional reeling machinery in the plant, also 20 looms. This will give them a total of 180 looms.

*Georgia, Hartwell. The Witham Cotton Mills, reported to build an addition to the plant, have started work on erection of same and expect to have it completed and in operation about Jan. 1st. They will install 84 new looms and a dye plant.

*Georgia, Jackson. The Pepperton Cotton Mills are attaching dobby heads to the present equipment of looms, to make towels and fancy goods.

Georgia, Thomaston. Work has been started on the erection of a large addition for the Thomaston Cotton Mills. Additional machinery will be installed, increasing the present spindle equipment to 15,000.

Kentucky, Covington.. The Argonaut Cotton Mills have completed the installation of twenty-seven 40 inch revolving flat cards and other machinery, bringing this mill up to date in every respect.

Maine, Westbrook. The Dana Warp Mills are installing six new combers, one ribbon and one sliver lap machine in the plant.

Massachusetts, Bondsville. The Boston Duck Co. is building an addition to their box room, which will double the present capacity.

Massachusetts, Bondsville. The Boston Duck Co. has added eight new Crompton & Knowles dobby head looms to the plant.

Massachusetts, Salem. The Naumkeag Steam Cotton Co. is installing about 100 new 60-inch Draper looms in the mill. Work is also progressing on a new 1,800 h. p. engine.

*Mississippi, Winona. The Winona Cotton Mills, reported to double the capacity of the plant, will install 5,000 new spindles and 200 looms. The present equipment consists of 5,000 spindles and 200 looms on sheetings, shirtings and drills.

New Hampshire, Nashua. The Jackson Co. is building a large addition to their finishing department.

New York, Victory Mills. The Saratoga Victory Mfg. Co. has added five new spinning frames to the plant.

North Carolina, Bessemer City. The Bessemer City Cotton Mills will install additional looms in the plant, now equipped with 9,200 spindles and 214 looms, on colored dress goods and shirtings.

North Carolina, Charlotte. The Louise Cotton Mill has recently completed installation of 5,000 additional spindles, giving a total of 25,000.

North Carolina, King's Mountain. Contract has been awarded for 3,000 additional spindles and twisters to be installed in the Bonnie Cotton Mills.

*North Carolina, Lumberton. Work has been completed on the new addition for the Lumberton Cotton Mills and the new machinery is being placed in position. The entire plant will be in operation by January 1st.

*North Carolina, Mt. Holly. The Nims Manufacturing Co. reported to make improvements to the plant, will increase the capital stock from $80,000 to $100,000. They expect to have the new machinery to be installed, ready to start operations, by December 15th. Will make yarns 10s to 20s, in ply, and seine twines, with total of 4,000 ring spindles, when additions have been completed.

North Carolina, Spray. The Leaksville Cotton Mills propose erecting a new dye house.

Pennsylvania, Philadelphia. J. T. Royle & Company, manufacturers of upholstery goods in the Dale Mill, Gillingham Street, have removed to the new Bromiley Mill, Leiper and Adams Streets, where they have greatly increased their capacity.

*Rhode Island, Pawtucket. The Hope Webbing Co. expects to begin work at once on the new mill building to be erected. They propose having same completed about March 1st, 1904. Will install 100 new looms.

Anderson, S. C. The Gluck Mills have ordered a complete equipment of humidifiers from the American Moistening Company, Boston, Mass.

South Carolina, Clover. Contract has been let by the Clover Cotton Mfg. Co. for the installation of 3,000 more spindles in the mill. This will give them a total of about 16,000 when completed.

*South Carolina, Columbia. The plan of reorganization of the Olympia, Granby and Richmond Cotton Mills was approved at the recent meetings of the stockholders and three mortgages to secure bonds on the three mills, aggregating $3,000,000, were authorized, executed and recorded. A new board of directors was formed, consisting of Stephen A. Jenks, Pawtucket; R. F. Herrick of Boston, representing the Draper Co.'s interests; R. P. Snelling, Newton; H. C. Fleitman, New York; Lewis W. Parker, Greenville, S. C.; R. Goodwin Rhett, Charleston; W. B. Smith and Wm. H. Lyles, Columbia, and Francis H. Carey, Baltimore. An executive committee was formed, comprising Messrs. Parker, Carey and Herrick, who will supervise distribution of the bonds among the creditors as soon as the various claims are audited. Mr. Parker was chosen temporary president.

*South Carolina, Hartsville. The Hartsville Cotton Mills contemplate having their new addition, about which previous report has been made, ready for installation of the machinery by January and the same in operation by March 1st. When completed this concern will have a total of 35,000 spindles and 1,050 looms.

South Carolina, Lando. The Manetto Cotton Mills are installing additional mule spinning machinery in the plant and will also put in looms.

South Carolina, Union. It is reported that the Monarch Mills, which have been recently increasing their plant to 28,000 spindles and 734 looms, will probably install 12,000 more spindles and 250 looms, which the new building is capable of accommodating.

Tennessee, Nashville. New stock to the amount of $191,000 has been subscribed to purchase new machinery for the Tennessee Manufacturing Co.

*Virginia, Petersburg. The Swift Creek Cotton Mills, now owned by the Chesterfield Mfg. Co. will soon be put in operation. The plant has been repaired and improved and new machinery installed.

Mills Starting Up.

*Massachusetts, South Hadley. It is understood that the reorganization of the old Glasgow Mills is progressing satisfactorily, and that C. W. Dennett of the Johnson-Dunbar Company at North Adams has been engaged as general manager, his resignation from that company to take effect December 1st. The Glasgow Mills have been shut down for some time, and are being refitted and enlarged and about $150,000 will be expended.

New York, New Hartford. The New Hartford Cotton Mfg. Co., which has been closed for several weeks, has resumed operations in full.

*North Carolina, Charlotte. Operations will start up in a few weeks by the Continental Cotton Mfg. Co., which purchased the old Victor Cotton Mills. The building is being overhauled and new machinery including 30 (Saco & Pettee) cards, drawing frames, lappers, etc., installed.

*Pennsylvania, Philadelphia. Operations have been started by Daniels & Kane in the Dale Mill, manufacturing damasks.

Tennessee, Jonesboro. Operations have been resumed in the Jonesboro Yarn Mills, which have been idle for some time.

Danville, Va. The Dan River Mfg. Company have placed their order with the American Moistening Company for the complete equipment of humidifiers.

Mills Shutting Down.

Massachusetts, Fitchburg. The Fitchburg Cotton Duck Mills have been shut down, owing to the high price of cotton.

Rhode Island, Pawtuxet. The Pawtuxet Textile Co. is closing out the business. Concern manufactured fine shirtings, cotton, mercerized and silk dress goods.

WOOLEN.

New Mills.

Maine, Skowhegan. The Somerset Worsted Co. has been organized with J. C. Griffin, president; Edwin Gledhill, treasurer and Ralph Gledhill, general manager, to operate the Lakeside Worsted Mill, manufacturing worsted cloths.

*New Hampshire, Franklin Falls. James E. Leach, reported previously as interested with John Holland in starting up the carding and spinning departments of the Aiken Mill, writes that they expect to start up about the first of the new year, carding and spinning yarns of any stock or size.

Pennsylvania, Philadelphia. Art squares are being manufactured by Henry McCauley on three power looms at Mascher and Jefferson Streets. Business with him is good, having more orders than he can turn out. Mr. McCauley was formerly located at Howard and Berks Streets with David McDowell in the same business. The goods are sold direct and he expects to increase his capacity in a short time.

Pennsylvania, Philadelphia. The Cumberland Worsted Company has just started up on suitings and trouserings in the Dale Mill on Gillingham Street, Frankford. The company has 8 looms in operation and will put in 10 broad looms for which they have not yet placed an order. They are very busy, the goods being sold direct. Mr. William Hasseldin, one of the partners and superintendent of the establishment has had long experience in this business and was for some time in charge of the linen department of Brunner's Mill in the same town.

Pennsylvania, Philadelphia. The Philadelphia Felt Company, Ltd., is about to ask for incorporation papers. The company has rented quarters in the building at the north-east corner of Adams and Emerald streets, in which they have installed all the machinery necessary for the manufacture of paper makers' felts, etc., and is now in operation. Mr. F. S. Christian, of 2514 Frankford Avenue, is one of the parties interested in this new enterprise.

Pennsylvania, Philadelphia. A new company, the Maynard Mills, with a capital of $100,000, is about to start in business in the mill at the corner of 6th and Columbia Ave., where they will manufacture woolens and worsteds for women's wear,

operating 20 looms at the starting and an addition of 20 more when the business is under full sway. The goods will be sold through W. V. Bishop, 83 and 85 Green Street, New York. The officers are: H. J. Maynard, president; H. H. Bosworth, vice-president and treasurer and William Steel, secretary and superintendent. Mr. H. J. Maynard, the president, was originally with the Assabet Manufacturing Co., and for the past six years manager of the silk manufacturing department of The John B. Stetson Co., a position which he will still continue to hold. Mr. H. H. Bosworth was formerly connected with the Aiman & Harper Manfg. Co., now J. H. Aiman of Philadelphia; and Mr. Steel was the designer and assistant superintendent of Long Bros., Philadelphia, for five years. These gentlemen are all graduates of the Philadelphia Textile School and members of the Board of Governors of the Alumni of that institution and have had long and practical experience in the business. Mr. Bosworth, besides starting the mill, will also represent it through the selling house in New York.

*Rhode Island, Greystone. Joseph Benn & Sons recently incorporated with capital stock of $1,000,000, will build an entirely new plant. Plans have not yet been completed for the new buildings.

*Tennessee, Springfield. The Springfield Woolen Mills Co. will start operations December 1st in their new mill, making blankets. Plant is equipped with one set 60 in. cards and 10 broad looms and operated by steam power. Dye house is also attached. H. L. Dulin is president of the concern; M. D. Woodward, treasurer, and Harry Tatham, superintendent. Goods are to be sold direct. They contemplate installing another set of cards and 12 looms in the spring.

Enlargements and Improvements.

Connecticut, Thompsonville. An addition is being built to the dyeing department of the Upson-Martin Carpet Co.'s plant.

Iowa, Des Moines. An addition, 60 by 48 feet, two stories, is to be built to The Capitol City Woolen Mills, Scheuerman Bros., proprietors.

Maine, Hartland. The Linn Woolen Co. will install a large steam engine in the plant to furnish power to run the mill in times of low water.

Maine, Madison. The Indian Spring Woolen Co. is reported turning the looms around in the weave shed, preparatory to introducing the two loom system.

Maine, Pittsfield. A new wool house, 132 by 20 feet, is to be built by the Waverly Woolen Co.

Barre, Mass. Francis Willey & Co. have adopted the American Moistening Company's system of humidification in their mill.

Massachusetts, Indian Orchard. The Rhode Island Worsted Co. will operate its plant nights during November. They propose doubling the capacity of the plant. A 50 H. P. motor has been installed and a number of new looms are running.

Massachusetts, Millbury. The Bowden Felting Mills Co. is to make extensive additions to the plant.

Massachusetts, North Chelmsford. A brick building, 200 by 80 feet, three stories, is under construction for Geo. C. Moore, to be used in connection with his wool-scouring plant.

Massachusetts, Ware. Chas. A. Stevens & Co. are installing additional machinery in the spinning department of the mill.

Minnesota, Pillsbury. An additional set of cards has been installed in the Golden Fleece Woolen Mills, also two 220 spindle mules, new looms and some finishing machinery.

New Hampshire, Rochester. The Rochester Woolen Co. has purchased the machinery in C. W. Springfield's mill at Alfred, Me., and will install same in their mill here.

New Hampshire, Peterboro. An addition is being built to Jos. Noone & Sons' storehouse.

New York, Marcellus. An addition, 108 by 48 feet, has been built to the Mill No. 1 of the Crown Mills. Carding and other machinery will be installed.

New York, Stottville. The Stott Woolen Co. has recently installed 24 additional looms. The carding and spinning departments of No. 4 mill are operated with night and day force.

New York, Utica. The Globe Woolen Company has installed 50 new looms recently, in the mill. Other changes have also been made to the plant.

Ohio, Zanesville. The Zanesville Woolen Mills are replacing some of the old machinery with new. New picker has recently been installed and order placed for three new mules.

*Ontario, Dundas. The Empire Carpet Co., whose mill at St. Catherines was destroyed by fire, is the concern which has taken the building formerly occupied by the Ontario Felt Co. They expect to have the mill, which is being equipped with new machinery, in operation in the near future.

Ontario, Guelph. The addition to the Guelph Carpet Mill Co.'s plant is completed. They have installed eight new carpet looms and will put in considerable other machinery, including an improved electric lighting plant. A new stone boiler house, in which two 115 h. p. boilers and a 115 h. p. engine will be installed will also be built.

Ontario, Markham. The Maple Leaf Woolen Mills Co. have built a new dye house and installed considerable new machinery.

Ontario, Streetsville. The National Woolen Mills contemplate installing another set of cards soon.

Pennsylvania, Philadelphia. Work has been completed on two story building, 100 by 72 feet, for F. Warner, proprietor of the Sterling Carpet Mills. An addition will be made to the boiler house in the near future.

Pennsylvania, Philadelphia. A new dye house, 60 by 75 feet, is to be built for Bromley & Sons, at A Street and Lehigh Avenue.

*Rhode Island, Davisville. The Davisville Woolen Co., reported organized to operate the plant formerly run by the Reynolds Mfg. Co., is changing the machinery from one mill to the other. This is so that all the carding and spinning will be located in one plant and the weaving and finishing in another.

Olneyville, R. I. The Pocasset Combing Com-

pany are putting in the American Moistening Company's system of humidifiers.

Tennessee, Jefferson City. The Jefferson City Woolen Mills Co. contemplate building an addition to the plant and adding more machinery.

*Wisconsin, Onalaska. The Onalaska Woolen Mfg. Co. is putting in a small knitting plant in their mill. They expect to make all wool socks, weighing from 2 to 4 lbs. to the dozen.

Mills Starting Up.

Connecticut, Staffordville. The Hope Mill has resumed operations.

*Maine, Corinna. Operations have been resumed in the Corinna Woolen Mill.

*Massachusetts, Monson. Operations have been resumed in the Cushman Mill which was closed for purpose of allowing installation of new boiler.

*Massachusetts, Conway. The Delabarre Mills have been started up. This is the plant taken by James Hennessy, manufacturing men's suitings.

*Massachusetts, Wales. The trustees in bankruptcy of J. H. Loudon, owner of the Golden Rod Woolen Mill, have sold same to Edward Loudon of Worcester for more than the value set by the appraisers. Ten looms have been started up and it is expected that the whole plant will soon be in operation.

Pennsylvania, Tunkhannock. The Winola Woolen Mill has started up with a full force of operatives.

Mills Shutting Down.

*Connecticut, Staffordville. The Staffordville Woolen Company's mill has beep shut down. It is hopd that the concern will be able to tide over the present financial difficulties and continue operations, although they are reported as not desirous of so doing.

Massachusetts, Huntingdon. The Massasoit Woolen Mill has been shut down owing to cancellation of orders. It is thought that operations will not be resumed for several weeks.

KNIT.

For Knitting Mill News, see Knitting Department.

SILK.

New Mills.

*Connecticut, Manchester. Although the new building has not yet been completed for Matchett Bros., work has been started on the installation of the machinery. Several looms have already been placed. Mr. Richard Matchett will be the local representative of the firm, while Mr. David Matchett will be located in New York and have charge of the selling.

*Connecticut, Norwalk. The new mill under construction for Otto Mueller & Co., will be known as the Mueller Gloria Mills. They will manufacture umbrella cloth. Richard Mueller is buyer for the concern.

New Jersey, Paterson. The Harmony Silk Company has been incorporated, with capital stock of $100,000, by H. Walter Baer, William Rogers and David Schmidt, of this place. They will operate a throwing and weaving plant.

*New York, New York. The Tremont Mills, capitalized at $100,000, will operate 80 looms on narrow silk ribbons. The plant will be operated by steam and electricity. Goods will be sold direct.

Ontario, Peterboro. The Colonial Weaving Co. is installing machinery for manufacturing silk ribbons and other narrow goods. R. H. Kells is in charge of installing the machinery.

*Pennsylvania, Dushore. Operations will start about January 1st, 1904, by the Dushore Silk Manufacturing Co., recently incorporated with capital stock of $50,000. Alphonsus Walsh is president of the company; M. D. Swarts, treasurer; A. K. Morrison, agent and buyer, and N. P. McTague, superintendent. They will weave silks, operating 150 looms. Steam power will be used. Will sell product direct.

Pennsylvania, Mercer. R. R. Wright, Herman Frankel, Carter Bros. and C. G. Williams are interested in the establishment of a silk mill here. Contract has been awarded for erection of new building, 130 by 40 feet, two stories. It is expected to have the plant equipped and ready to start operations by February 1st, 1904, with about 50 looms.

*Pennsylvania, Nicholson. We have been advised by W. B. Crane that the project of establishing a branch mill here is as yet very indefinite.

Pennsylvania, Philadelphia. The silk department of the John B. Stetson Mfg. Co. is now in full operation, making hat ribbons on looms designed and built in the mechanical department of the company. Every machine is operated by an individual electric motor. Production is 40,000 yards per week, all used in the trimming of Stetson's hats. There are 9 braiders, 5 spoolers, 13 warp mills, 17 looms. Use the Universal system of doubling and winding. Buy raw silk and have it thrown and dyed on commission. Do their own finishing. Dye some cotton, which they import from Fine Spinners' Association of Manchester, Eng. Mr. Maynard of Maynard Silk Mills, is the manager.

Enlargements and Improvements.

*Pennsylvania, Altoona. Schwarzenbach, Huber & Co. are making preparations to enlarge the silk mill at Altoona. They expect to have the increased plant in operation next week.

Pennsylvania, Palmerton. Read and Lovatt are installing a number of new machines in their silk mill at this place.

Pennsylvania, Williamsport. John N. Stearns & Co. will instal 25 ribbon looms in the plant.

Pennsylvania, Philadelphia. The Eclipse Fast Color Dye Works, 1726 and 28 Hope Street, Julius Phillips, proprietor, has taken over the business of A. Weber at that address. They make a specialty of fast black and fancy colored hosiery and lisle finishing. The establishment is now being overhauled and the machinery being put in first-class condition and will be in full operation within a few days. Mr. Alvin Weber, the former proprietor, will be retained by Mr. Phillips to manage the business.

Pennsylvania, Mauch Chunk. The Mauch Chunk Silk Co. has increased the capital stock from $12,-

000 to $50,000. They will increase the number of spindles from 3,000 to 8,000.

Pennsylvania, Philadelphia. Contract has been let for erection of a new dye house, 80 by 30 feet, two stories, brick, for Richardson, Weir & Co., proprietors of the Westmoreland Dye Works.

Pennsylvania, Philadelphia. The firm of J. Taylor & Sons, running the Cheefoo Silk Mills, 2627 Mutter street, which were shut down for almost a month has been changed; Messrs. George Taylor & Brother taking over the business of the old concern. The mill is now in full operation and orders coming in steadily. The equipment consists of 14 looms, to which 6 more Knowles looms will be added. The mill is run on vestings, shirt waistings, dress goods and novelties, the goods being sold direct and through agents. Mr. Taylor is the superintendent and states that they are on the market for a warping frame and a new bobbin frame and will also put in an Altemus winder.

Mills Starting Up.

*Pennsylvania, Kutztown. Operations have been resumed in the Berks Silk Mill, which has been idle for several weeks.

MISCELLANEOUS.

New Mills.

*Massachusetts, Millbury. The United States Linen Co. has started operations with about twenty-five people. The force of operatives will be increased as the business warrants and it is hoped that the plant will be in full operation within a few weeks.

New Jersey, Braddock. (P. O. address Cedar Brook, Camden Co.) Frank Bailey, the well-known builder of yarn drying machinery and manufacturer of dey sticks, whose works are at Braddock and post office address Cedar Brook, Camden Co., N. J., is interested in a new mill which is to be built on his property and adjoining his present works, although it will be an entirely separate enterprise. A new building, about 70 by 25, 2 1/2 stories high, will be built, with engine and boiler house. A new company will be formed, which will probably be known as Bailey-Steel Mfg. Co., and associated with Mr. Bailey in this enterprise are his son and A. J. Steel, a practical man, familiar with the manufacture of all classes of upholstery goods. A line of novelty upholstery goods will be made, especially designed by Mr. Steel, who will be manager of the new enterprise. Looms adapted for this work will be installed. Work on the building will be begun very shortly, and it is expected to get the mill in operation in time for the next season's trade, which opens in September.

Although Mr. Bailey is largely interested in this new enterprise, it will in no way interfere with his other business, to which he will continue to give his exclusive time and attention.

Northwest Territory, Edmonton. A linen factory is to be established here. A new building, 500 by 100 feet, will be erected. The town council has granted bonus of $5,000 and exemption from taxation for ten years.

*New Jersey, Bridgeton. The Bridgeton Bleaching & Finishing Works has been incorporated with capital stock of $250,000. They will start operations in March, with J. F. McMahon superintendent, using part of the old iron works, bleaching piece goods up to 60 inches. They expect to erect two new buildings, 75 by 100 feet and 179 by 40 feet, for which specifications and plans now out are being solicited on plant for 5,000 yards daily. W. B. West, of W. P. West & Son, Philadelphia, is interested in the company.

New Jersey, Paterson. A large dye plant is to be erected on the old Industry and Harmony Mill property, owned by the Paterson Savings Institution, for Foremann, Stumpf & Co., who contemplate increasing their business. Part of the concern's plant was washed away in the recent flood. The new building will be 200 by 65 feet, two stories high. It is proposed having the mill completed about February 1st.

Pennsylvania, Philadelphia. Thomas Davenport is manufacturing rope portierres on 1 spooling frame and 1 twister at 2627 Mascher street, selling the product direct. He reports being very busy and is on the market for a frill machine. He buys silkoline and cotton yarns.

Pennsylvania, Philadelphia. Hughes Fawcett, of 115 Franklin St., New York, N. Y., manufacturer and importer of flax, hemp and jute, has established a plant at 4155 Frankford Ave., Frankford, for manufacturing linen threads and yarn for the hosiery, underwear and electric trade. The above firm, known as the Contria Mfg. Co., is also prepared to do winding, coning, tubing and twisting for the trade. Keith Skein is the manager of the plant.

Enlargements and Improvements.

Pennsylvania, Philadelphia. Nine new boilers will be put in the E. H. Fitler Cordage Works on State Road. The contract has been given out and the permit granted for the building of the foundations, the work to be commenced at once. The cost will be $6,000.

*Pennsylvania, Reading. The Liberty Dye Works, which were rebuilt, are now in full operation. The capacity of the plant has been greatly increased. The main building, to which a third floor has been added, is 40 by 80 feet, with annex, 40 by 80 feet and separate boiler house. Additional machinery has also been put in.

FAILURES AND SUSPENSIONS.

Connecticut, Middleton. F. C. Lum (New Haven) has been appointed temporary receiver of the L. D. Brown & Son Co., manufacturers of silk goods.

New York, New York. L. E. McConnell Manufacturing Co., 56 Worth Street, operating mill at Bayonne, N. J., on sweaters and knit goods, have made an assignment. Mr. Louis E. McConnell filed a petition in bankruptcy individually and as a partner in the firm, but Robert M. Evans, the other partner, refused to join in the petition. Mr. McConnell's liabilities are placed at $72,735, with nominal assets of $31,000. S. Hirsch & Co. are secured creditors for $59,455 and have as collateral $69,678 in merchandise and accounts.

FIRES.

Connecticut, Derby. A. H. & C. B. Alling's mill has been damaged by fire. The loss is estimated at about $30,000. Plant is operated on underwear and half hose.

Pennsylvania, Allegheny. John Flocker & Co.'s rope and twine plant, located at Hoboken, has been destroyed by fire. The loss is estimated at about $20,000, partly covered by insurance. Have not yet fully decided on rebuilding.

Pennsylvania, Philadelphia. Joseph Gubbins' waste mill, at Rush and Tulip Streets, has been destroyed by fire. The loss is placed at about $5,000.

FACTS AND GOSSIP.

*Arkansas, Fayetteville. J. H. McIlroy, vice-president of the McIlroy Banking Co., is interested in the Fayetteville Cotton Mills Co., proposed. A mill of 10,000 spindles and 300 looms is projected. Subscriptions are being solicited.

Connecticut, Meriden. The Meriden Woolen Co. has been incorporated with capital stock of $200,000 to operate the Rawitser Mills. Simon Rawitser, Herman Rawitser and Julius Ballin are the incorporators.

*Connecticut, Stafford Springs. The Staffordville Woolen Co., recently reported in financial difficulties, has been shut down and an assignment has been made in favor of the creditors to E. C. Pinney.

*Georgia, Eatonton. The Eatonton Electric Cotton Mills have been sold to J. B. and A. B. Floyd, of Savannah, Ga., for $42,000. The referee in bankruptcy refused to ratify the sale of the plant to J. W. English, as was previously reported.

Georgia, Tallapoosa. It is reported that the business men of this place are endeavoring to secure location of a knitting mill.

Indiana, South Bend. The Zeigler Bullet-Proof Cloth Company has been incorporated with capital stock of $10,000 by Brother Cassmer Zeigler and Alexander Buechler of Chicago, Ill.

Kentucky, Louisville. The Mayfield Woolen Mills Co. has closed the St. Louis (Mo.) branch, devoted to cutting and tailoring and will remove same to Louisville.

Massachusetts, Canton. It is reported that the old Lexington Print Works will resume business. About 40 people will probably be employed.

*Massachusetts, Monson. The Heritage & Hirst Mill is to be sold at mortgagee's sale in December.

New Bedford, Mass. The Manomet Mills have ordered a complete equipment of humidifiers of the American Moistening Company, Boston, Mass.

New Bedford, Mass. The Potomska Mills are extending their system of humidifiers installed by the American Moistening Company.

Massachusetts, North Brookfield. It is reported that a silk company contemplates locating here in building now vacant. They propose throwing silk and possibly do some weaving. E. H. Burnap is mentioned as interested in the project.

Mexico, Metepec. It is reported than an American-Mexican syndicate, capitalized at $3,000,000 (Mexican) will erect a large cotton mill at this place.

Minnesota, Minneapolis. The Peterson Carpet Co. has been incorporated with capital stock of $75,000, to manufacture carpets. Andrew P. Peterson, P. Gustave Peterson and Gustave A. Patri are interested.

Claremont, N. H. The American Moistening Company, Boston, Mass., are making an extensive installation of their system in the Monadnock Mills.

New Jersey, Paterson. John Wright has been appointed receiver of the Sussex Mill, E. Sargent, proprietor.

New Jersey, Paterson. The Art Fibre Co. has been incorporated, with capital stock of $90,000. by R. Murray, Henry Burnstein and Wm. Kaufman. They propose manufacturing silks and other textile fabrics.

New York, Amsterdam. The machinery, stock, etc., of the Steadwell Dyeing Machine Co., which was obliged to discontinue business because of an adverse decision in the United States courts in the action for infringement brought by the Klauder-Weldon Dyeing Machine Co., according to the Amsterdam Recorder, is sold at auction on foreclosure of chattel mortgages.

*New York, Dryden. An informal meeting was held recently at Hon. Geo. E. Monroe's office, to consider reorganization of the Blanket Company. D. R. Davenport, secretary and treasurer of the company and Mr. Lees, the latter of Philadelphia, were present. It is proposed to reorganize the company with capital stock of $25,000, with Mr. Lees as manager. They were successful in securing liberal subscriptions of stock at the first meeting and it is thought the project will be successfully carried through.

New York, New York. The New York Corduroy Mill, 407-413 East 91st Street, will sell their product direct. Goods were previously sold through Clyne & Ringe, with H. A. Caesar & Co., New York.

New York, Valatie. It is reported that the Wild Mfg. Co.'s mill has been purchased by an Albany concern, who will manufacture yarns.

North Carolina, Granite Falls. It is reported that the Rhodhiss Mfg. Co. contemplates building another cotton mill in Burke Co.

North Carolina, Lawndale. The Cleveland Cotton Mills have filed articles of amendment, changing name to the Lawndale Railway and Industrial Company and reducing the capital stock from $100,000 to $60,000. H. F. Schenck is president of the company and J. E. Reynolds, secretary.

North Carolina, Nickojack. The firm of Rice & Love, operating the Concord Woolen Mills, has been dissolved by mutual agreement. J. W. Rice has purchased Mr. Love's interest and will continue the business.

North Carolina, Roanoke Rapids. It is reported that the Paterson Textile Co., which has been making silk goods, will replace the silk machinery with looms for purpose of manufacturing cotton damask table covers. An addition is under construction to

one of the company's other mills for making the necessary yarn.

Ohio, Columbus. The Columbus Woolen Mills Co.'s plant is offered for sale. This company's plant is equipped for manufacturing blankets, etc.

Pennsylvania, Philadelphia. The business of Bray & Moulson, printers of hosiery on Hancock Street, above Oxford, has been taken over by Mr. John Bray who will take full charge in the future. Mr. Bray states that he is fairly busy at the present time and is about to place some new designs on the market which he thinks will meet with much favor among the manufacturers. The outlook with him is very favorable for the future.

*Pennsylvania, Reading. R. G. Scarlett, of Smith, Scarlett & Co., whose plant was destroyed by fire, advises us that business will not be resumed this year and in all probability never.

Pennsylvania, Philadelphia. The Tidewater Waste Company has disposed of its business to the Wissahickon Waste Co. The plant is located on Main Street, above Walnut Lane, Manayunk.

Pennsylvania, Philadelphia. The firm of Jos. Clough Sons & Co., running the Fairmount Dye Works at 618 N. 24th Street, is no longer in existence. James G. Carson is now the proprietor. They are very busy dyeing skein yarns and warps. H. T. Toy is the superintendent.

*Pennsylvania, Shamokin. Although E. O. Spindler has disposed of his plant at this place, nothing has been done concerning locating elsewhere.

*Rhode Island, Woonsocket. The Simson & Kirkaldy Worsted Mill was sold at public auction November 17th to James D. Colt of Boston, representing Boston capitalists, in which Andrew Aidee's name is mentioned. The price paid was $26,700.

*Texas, Brenham. The Brenham Cotton Mills are now in operation making brown domestics.

Personals.

Cotton.

F. S. Brown, of Nashua, N. H., has been engaged as carder and spinner at the Oakland Mills, Taunton, Mass.

George Garlick, overseer in the Kerr Thread Mills, Fall River, Mass., has resigned his position.

Charles Haynes, overseer of ring spinning at the Naumkeag Steam Cotton Mills, Salem, Mass., has resigned.

Clarence A. Horne has resigned as assistant overseer of weaving at the Boott Mills, Lowell, Mass., and has gone to the Aurora (Ill.) Cotton Mills, where he has charge of the weaving and dressing.

Frank Macland has accepted a position as mule spinner in the No. 4 mill, West Warren, Mass.

Byron Rollins has accepted the position of engineer for the Boston Duck Co., Bondsville, Mass. Mr. Rollins came from Chesterfield.

Edmund Spencer has resigned as overseer of weaving in the mill of the Bristol Mfg. Co., New Bedford, Mass.

Walter Sutherland has succeeded Daniel Burke as overseer of ring spinning at the Lippit Mills, Phoenix, R. I.

E. M. Tart, overseer of spinning, spooling, warping, etc., with the Altamahaw Mill, Elon College, N. C., has gone to the Dillon, S. C., cotton mill, where he has a similar position. John H. Anderson, boss carder, now has Mr. Tart's former duties in addition to his former work.

T. J. Wilson, overseer of spinning at the Forsyth Cotton Mill, Forsyth, Ga., has resigned to accept a similar position with the Trio Mfg. Co. at Forsyth.

Jerry Willmont recently ended his services with the Wauregan Company, Wauregan, Conn., after 28 years of service in the dressing department. Mr. Willmont will remove to New Bedford, where he will enter the grocery business together with his son.

Edward Wooley, designer at the Kerr Thread Co., Fall River, Mass., has severed his connection with that company, which has discontinued the department with which he was connected.

E. H. Wells has resigned as overseer of ring spinning at No. 4 Iron Works Mill, Fall River, Mass.

Albert Crenshaw of Philadelphia has been engaged as agent and manager of the Johnson-Dunbar Mills, at North Adams, Mass., succeeding C. W. Dennett, whose resignation takes effect December 1st. Mr. Crenshaw has had a large experience as a manufacturer.

L. W. Dexter, at one time overseer of spinning at the Atlantic Mills, is now overseer of spinning and carding in the Barker Mills, Auburn, Me.

C. W. Dennett has resigned as agent and manager of the Johnson-Dunbar Mfg. Co. at North Adams, Mass., to accept a position with the Glasgow Mills at South Hadley Falls, Mass., where he will act as general manager, having charge of the manufacturing and selling. Mr. Dennett went to North Adams from Westbrook, Me., eleven years ago to take the agency of the Johnson Mfg. Co. Since then the Dunbar Mill has been built, and later the two concerns became the Johnson-Dunbar Company.

T. E. Quinn resigns as overseer of spinning at the mills of Walcott & Campbell Spinning Co., New York Mills, N. Y. Thomas Parker, the other overseer of spinning in the same mill, will now have both spinning rooms under his charge.

Alfred Greaves, who for the past four years has been superintendent of the Crown Worsted Mills, Providence, R. I., has resigned. About 100 employees of the mill visited Mr. Greaves' home and presented their former superintendent with a gold watch and chain.

S. A. Garland, overseer of weaving at the Acushnet Mills, New Bedford, Mass., has resigned.

J.T. Hall, formerly of Macon, Ga., is the new superintendent of the Forsyth Cotton Mills, Forsyth, Ga. He succeeds J. T. Frazier, who recently tendered his resignation and has now retired from the mill business.

R. W. Gray, who for many years has been superintendent of the first cotton mill built in Gastonia, viz., the Gastonia Cotton Mfg. Co., has retired from business. C. H. Dunn has succeeded him. E. S. Moore, who formerly had charge of one of the departments of the Avon Cotton Mills, has been made overseer of weaving at the Gastonia Cotton Mfg. Co.

John F. Lord of Concord, N. C., has accepted the position of overseer of weaving with the Gaffney Mfg. Co., Gaffney, S. C.

J. T. Hall has succeeded T. J. Frazier as superintendent of the Forsythe Mfg. Co., Forsythe, Ga.

Matthew A. Rawlinson, superintendent of the Tremont and Suffolk Mills, Lowell, Mass., has resigned. He came to this country from England and became superintendent in 1894.

C. S. Hart has been appointed superintendent of the Concord Reformatory, Concord Junction, Mass.

Robert Cochran, late of Schuylkill Haven, Pa., and formerly of Norwich, Conn., has accepted the position of dyer and bleacher with the Montmorency Cotton Mills Co., Montmorency Falls, P. Q.

Charles C. Wise of New York, for many years with the American Woolen Company, has been engaged as general salesman of the J. L. & T. D. Peck Mfg. Co., of Pittsfield, Mass., and will open an office in New York.

E. E. Matthews is now manager of the Huntsville Cotton Mills, Huntsville, Ala., succeeding Luke Matthews.

Woolen.

William Appleby has resigned as overseer of carding at the George's River Mill, Warren, Me.

Stephen Brady, of Putnam, Conn., has taken a position as dresser tender with the Bay State Worsted Company of Worcester, Mass.

W. H. Berry has recently secured the position of overseer of spinning at the Millers' River Mfg. Co., Athol, Mass.

T. J. Chalk of Palmer, Mass., has gone to Dedham, Mass., to accept a position in a carpet mill.

Hartley Clinton has been engaged as overseer of dressing and spooling at the Clinton (Mich.) Woolen Mfg. Co

James J. Grady, formerly of Montville, Conn., is now boss carder in the Rawitser Mill, Mystic, Conn. J. Kennedy is the superintendent and G. Lambert, formerly of Montville, Conn., is the boss spinner.

H. Hennings has resigned as overseer of carding at the Golden Gate Woolen Mfg. Co., San Francisco, Cal., and a Mr. Waters of Philadelphia, has succeeded him.

Frank Hartley, of Lawrence, Mass., has succeeded G. E. Schofield as overseer of warping, filling and dressing at the Riverside Mill, Providence, R. I.

H. Homer is the new overseer of spinning at the Bigelow Carpet Co.'s mill, Lowell, Mass.

William Hussey, formerly overseer of carding at the Penobscot Woolen Mill, Dexter, Me., is now overseer of spinning at the plant of the Dunbarton Woolen Co., Dexter.

H. J. Kennedy has succeeded P. Hommelsheim as superintendent of the Brickner Woolen Mills Co., Sheyboygan Falls, Wis.

Albert Keighley is the new boss carder and C. Dowgill is the new boss spinner nights, at the Neponset Woolen Mills, Canton Junction, Mass.

Louis Melzer has resigned as overseer of spooling at the Livingstone Worsted Mill, Washington, R. I.

Oscar E. Pippin, who has been four years the boss dresser at the American Woolen Co.'s mill, Fairfield, Me., has severed his connection with the company and has gone to Lawrence, Mass.

Henry Schoenfeld, overseer of carding for the Webster Woolen Co., Sabattus, Me., for the past 18 months, has resigned, and goes to Lisbon Centre to fill a similar position for the Farnsworth Mfg. Co.

James H. Hendry, late of Pittsfield, Mass., has accepted the position of general superintendent of the Auburn Woolen Co.'s mill at Peterborough, Ont.

William K. Denniston, designer at the Assabet Mills, Maynard, Mass., has resigned to accept a similar position in Utica, N. Y.

Benjamin B. Crowther, formerly overseer of the beaming department, has been made assistant superintendent and designer of the May Manufacturing Company, Aston Mills, Pa.

George Dick, formerly of Carleton Place, Ont., is the new superintendent of the Beaver Dam (Wis.) Woolen Mills.

Thomas J. Firth has severed his connection with the Hartford Carpet Corporation, Thompsonville, Conn., as superintendent.

William Black has resigned his position as finisher in the Hewson Woolen Mill at Amherst, N. S., and taken a similar position in the Willet Mills, Chambly, Canton, Que.

Richard Howarth, formerly superintendent at Joseph Noone's Co., Peterboro, N. H., has been appointed general manager of the Megunticook Woolen Co., Camden, Me.

Harry Balcolm has resigned as overseer of the carding department at the Farnsworth Co., Lisbon Centre, Me., and is now with the W. E. Hayward Co., East Douglas, Mass.

George Hinchliffe, formerly agent of the Assabet Mills and later conducted the Empire Woolen Mills at Clayville, N. Y., hae been engaged as expert for the next six months at the Talbot Mills, North Billerica, Mass.

Frank L. Morginson, formerly of Clinton Woolen Mfg. Co., Clinton, Mich., is the new finisher at the Oakland Mill, Sykesville, Md.

Albert H. O King has resigned as dyer at the Warrenton Woolen Co., Torrington, Conn.

George E. Schofield, for ten years in charge of the warping, filling, dressing and drawing in de-

partments of the Riverside Mill of the American Woolen Co., Providence, R. I., resigned his position. He will be succeeded January 1st by Frank Harpley, of Lawrence, Mass.

William Mitchell, superintendent of the Crescent Worsted Co., Lawrence, Mass., has resigned.

Miscellaneous.

Jamieson Proven, late of the Eddystone, Pa., Print Works, is now foreman sketchmaker at the Rockland Print Works, Garnersville, N. Y.

Thomas Mansfield has retaken his position as second hand of the Bleachery Department, Bondsville, Mass.

Edward Pearson, formerly of Lonsdale, R. I., is superintendent of the bleaching at the New York Mills, New York.

Deaths.

John Dickey, until two years ago a member of the firm of Porter & Dickey, woolen manufacturers, Philadelphia, Pa., now Charles Porter & Son, died November 20 of peritonitis. Mr. Dickey was born in 1824 and came to Philadelphia when a young man. In 1885 he was made president of the Ninth National Bank of Philadelphia, and in 1891 president of the International Trust Company. He retired from active business about two years ago.

Henry Fletcher, agent for the Fletcher Mfg. Co., Providence, R. I., died recently. Mr. Fletcher was born in Providence in 1862. He entered the employ of the Fletcher Mfg. Co. when a young man, and worked his way up to the position of a director in the firm. His wife and one daughter survive him.

Andrew S. March, for many years a prominent resident of Newton, Mass., died Nov. 3d at his home, after an illness of several months. He was born in Boston in 1833, and entered the thread business in early life, which he continued until his retirement from active business some years ago.

Henry M. Love, a retired silk manufacturer, died October 27, after an illness of several months.

N. F. Cherry, who until about six months ago was president of the Florence (Ala.) Cotton Mills, and who retired from active work then on account of failing health, died recently at his home in Florence. Mr. Cherry was widely known in mill circles.

Frank Greswald Tefft, who retired two years ago from the Tefft-Weller Company, of which his father, the late Erastus T. Tefft, was founder, died at his home in Great Barrington, Mass., recently. He was fifty-five years of age and had been in the dry goods concern established by his father all his business life. He was a member of the Manhattan and Players' Clubs, the American Geographical Society and the Sons of Colonial Wars. He leaves one son, Erastus T. Tefft, a member of the Stock Exchange.

Ernest Otz, a well known silk manufacturer, died at his home in Hoboken, N. J., October 31. Mr. Otz came to Hoboken twenty years ago from Italy, where he was engaged in the manufacture of silk. He began business here and was at the time of his death a member of the firm of Schwartzenbach, Huber & Co., with plants in West Hoboken, Altoona, Pa., and Switzerland.

Daniel D. Tompkins, who for many years was connected with the firm of John H. Stearns, silk manufacturers, Manhattan, New York, died in Kansas City recently. He had gone west on business. His home was in Brooklyn.

Peter Campbell, for twenty-nine years a dyer in the employ of Alexander Crow, at the Caledonia Carpet Mills, Philadelphia, died recently. Mr. Campbell came to America from Glasgow, Scotland, in 1841.

William J. Thompson, superintendent of the United States Linen Company, died at his home in Millbury, Mass., recently. Mr. Thompson was a native of Ireland. It was there he gained his first experience in the linen business, in which he had since attained considerable note as an expert. He had a varied career in manufacturing lines, and his reputation as an expert commended him to the attention of the United States Linen Co., who secured his services September. He leaves a wife, one son and one daughter.

Charles B. Alling, a member of the firm of A. H. & C. B. Alling, which operate the Paugasset Mills in Derby, Conn., died November 4. A cerebral hemorrhage induced by the excitement attendant upon a fire which destroyed a part of his factory caused his death. He was 79 years old.

Oliver W. Buckingham, of the firm of Buckingham, Paulson & Co., commission merchants and yarn dealers in New York, died suddenly October 31. He was taken ill in the New York Life Insurance Building and before medical assistance could be had he was dead. Apoplexy is supposed to have been the cause. Mr. Buckingham was 60 years old. In 1868 he came from New Milford, Conn., to New York, and in 1877 entered into partnership with Mr. Paulson as commission merchants and yarn brokers and dealers. The firm has become one of the largest engaged in this branch of business. Mr. Buckingham was widely known and respected by a very large circle of friends and business acquaintances, to whom the news of his sudden death will come as a great shock. His wife died about five years ago, and no children survive him.

New Publications.

The American Weaver and Catalogue of Woolen and Worsted Fabrics; G. R. Rymarczick. Price $1.00.

This work has been written to give information regarding the various kinds of textile fabrics on the market, and particularly with the object of distinguishing goods made of pure fibre from adulterated fabrics. The various subjects treated are arranged in alphabetical order. This is followed by directions for testing textile fabrics to determine the materials of which they are composed. The book is pocket size and contains much valuable information concerning woolen and worsted fabrics.

The Adoption of the Metric System in the United States, Bulletin No. 23; American Chamber of Commerce, Paris, France.

This pamphlet contains an abstract (in English) of the discussion before the French Society of Civil

Engineers regarding the proposed adoption of the metric system by the United States. At that time the American Chamber of Commerce at Paris submitted to the French engineers a series of thirty questions as to the effect of the metric system on foreign trade and the difficulties that had been met with in France in eradicating the old units. The answers of the engineers to these questions are also included in this pamphlet and will doubtless be of much interest to all interested in the metric question.

Bookkeeping for Weaving Mills; by Emil Bittner; A. Hartleben, Leipzig, Germany; price 75 cents.

This is a text book used in the schools of Germany and treats of the methods of bookkeeping adapted to the weaving industry as carried on in that country. It is illustrated with numerous blank forms and doubtless the American manufacturer could obtain many valuable hints from it for his own use. The text is in German.

Cotton Spinning (Filature du Coton); by J. B. Haeffele and Paul Dupont; C. Cuny, Saint-Die, France. Price $2.50.

This is a practical handbook on cotton spinning compiled for the use of French manufacturers. It has a very wide scope and, in fact, the chief criticism that can be offered is that the author has tried to cover too much ground. Otherwise the work is excellent and its having reached the third edition shows the high esteem in which it is held in the French cotton industry. The work is divided into the following chapters:

Formulas and Recipes: This includes many rules and tables and much information upon mechanical problems arising in the mill.

Definitions: A very valuable chapter giving the technical terms in use in both the manufacture and sale of cotton products.

Numbering Yarn: Here the various systems of numbering yarn are explained, cotton yarn occupying the leading place as it naturally would in a work on cotton spinning. The author does not mention the metric system of numbering cotton yarn, as the practice outside of France is to number cotton yarn by the English standard. In the French industry a system based on the French pound of 500 grams is used.

The next chapters treat of the preparatory processes, carding, combing, drawing and spinning. The concluding section of the work is devoted to mill construction and methods of estimating the cost of goods.

Calendar for the Cotton Industry (Kalender fuer die Baumwoll-Industrie) 1904; Gerhard Kuhtmann, Dresden, Germany. Price $1.00.

This is the 1904 edition of a catalogue which has become a standard handbook of the German cotton industry. It contains the usual amount of technical information relating to the different processes of manufacturing cotton, with a large amount of additional material which will be found of great interest to manufacturers in general.

Damaged Wool and Its Relation to Sheep Dips; S. B. Hollings; William Byles & Sons, Bradford, England. Price 50 cents.

This is a carefully written monograph on sheep dips and the resulting damage to wool. It is written from the Bradford standpoint, but contains much information that will be of value to the sheep breeders in this country.

Scouring (Die Waescherei); Georg Roggenhofer; A Ziemsen, Wittenberg, Germany. Price $2.50.

This is a manual treating of the various methods of cleansing garments. It is carefully written, well illustrated and treats of every branch of the art. The ground covered by this valuable work can be judged by the following abstract from the table of contents:

Installations for cleansing establishments; garment cleansing establishments; machinery and tools required; removing steam and dust; precautions against fire and explosions of benzine; properties of benzine soap; extinguishing benzine fires; safety tanks; remedies in case of accident; benzine washing machines; centrifugal extractors; removing spots of all kinds; wet cleansing and bleaching; testing water; cleansing feathers; bleaching jute, straw, gloves and furs; preventing damage from moths; cleansing laces, umbrellas, rugs, etc.; installation for scouring white goods; finishing; waterproofing; pressing; cleansing feather beds; carpet cleansing machines, etc., etc.

This abstract gives but an imperfect idea of the ground covered by this book. It is a work of much value to those engaged in the dry and wet cleansing of garments. The text is in German.

Brazil (Brasilien); by Dr. Walther Kundt; Franz Siemenroth, Berlin, price $1.00.

This is a book of 120 pages giving an account of the commerce of Brazil. Brazil is a country in which German enterprise has been very marked and Dr. Kundt's book contains a large amount of information of interest to all manufacturers engaged in trade with that country. The text is in German.

Business Literature.

Opportunities; M. Schulter, Industrial Commissioner, St. Louis, Mo.

This is an illustrated pamphlet giving in condensed form convenient for reference information regarding the business opportunities in the towns and different locations along the line of the St. Louis and San Francisco railroad. This information is arranged in parallel columns; on the left is a brief description of the town and opposite it, on the right, is a statement of the different kinds of business for which the place is best adapted.

Theodor Groz and Sons, Ebingen, Germany.

This is a special catalogue commemorating the fiftieth anniversary of the founding of this well-known firm of knitting needle manufacturers, whose product is known in all parts of the world where knitting is done by power. The book contains an interesting sketch of the history of the firm and its growth is illustrated by views of the works at various periods since its establishment.

The Rhoades-Chandler Separator and the Sullivan Shuttle Guard.

The Draper Co. are distributing cards illustrating and describing the Sullivan Shuttle Guard, which they claim is the best guard on the market, also the Rhoades-Chandler Separator, whose merits have been thoroughly tested by a large number of mills

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Foreign Users of Engines; Allis-Chalmers, Chicago and New York.

This booklet gives a partial list of the foreign users of Corliss pumping, hoisting, presser and blowing engines built by the Allis-Chalmers Co. Nearly every country in the world is represented and the list shows the wide extent of the business done by this well-known concern.

Blowers and Fans.

The Hartford Blower Company, of Hartford, Connecticut, manufacturers of the Hartford improved adjustable blowers and exhaust fans, have just received another order from the L. S. Starett Company, of Athol, Massachusetts.

This is the third order from this firm, and coming as it does from a conservative firm, who purchase only the best improved machinery, is a flattering testimony of the excellent quality, workmanship and efficiency of the Hartford fans as well as the Hartford exhaust system and mechanical draft apparatus.

New Southern Office.

Richard A Blythe, the well known commission merchant and dealer in cotton warps and yarns, has opened a new office in Atlanta, Ga., at 1018 Century Building. Mr. William H. Harris is his Southern representative. Mr. Harris will be remembered as formerly connected with the Textile Excelsior, and later as manager of the Atlanta office for Stuart W. Cramer. Mr. Blythe does a very large business for Southern mills.

Rope Machinery.

The Haskell-Dawes Machine Company are enjoying what has been the most prosperous year of their existence, having recently secured several important contracts for spinning, forming and laying machinery, which will keep them very busy until April next.

Among other contracts, they are building all the spinning and rope machines for the new Puget Sound cordage plant of the Portland Cordage Company, besides several rope machines for Australia, Sweden and England, and have just completed the equipment for the new Georgia Cordage Company's cotton rope plant.

They are also furnishing the new and superior equipment which the American Mfg. Co. are to add to their present extensive plant, and are now making some addition to their plant to enable them to meet the growing demand for their improved twine and rope machinery.

Mill Chemists Move to Larger Quarters.

Messrs. Little & Walker, well-known chemical experts and engineers, announce their removal to 93 Broad St., corner of Franklin, Boston. In their new quarters, their facilities are greatly extended for handling all matters relating to technical chemistry, which includes analysis, research, expert reports, advice and expert testimony in chemical patent cases. Mr. Arthur D. Little of this firm is perhaps more frequently called to testify as expert in chemical patent cases than any other chemist. There is hardly a chemical patent case of prominence in recent years with which he has not been associated. This firm has also made a specialty of matters pertaining to cellulose, which in its different branches, covers all matters pertaining to cotton fibre, mercerization, artificial fibres, etc.

A Good Boiler Compound.

A boiler compound that does the work satisfactorily in a textile mill is indeed hard to find. The International Boiler Compound Co. claims to have solved the problem. Their compound has been sold to a number of Southern textile mills, including among others the Lowell Cotton Mills, Lowell, N. C.; Lawrence Cotton Mills, Lawrence, S. C.; Belmont Cotton Mills, Shelby, N. C.; Wylie Cotton Mills, Chester, S. C.; Victor Cotton Mills, Charlotte, N. C.; York Cotton Mills, Yorkville, S. C.; W. R. Kindly Cotton Mills, Concord, N. C.; Cheswell Cotton Mill Co., Westminster, S. C.

The company offers to analyze free of charge a sample of any customer's water supply and will prepare a compound suited to the water of any locality. Dr. A. W. Kinkaid has written a booklet which will be sent free of charge to anyone writing to the International Boiler Compound Co., 48 Market St., Chicago, Ill.

New Works of Their Own in Philadelphia.

The American Knitting Machine Co. whose shops and offices were previously located at Woonsocket, R. I., and who are the builders of the new Victor Automatic Seamless Knitting Machine are now installed in their new works in Philadelphia, Pa., and are in a better position than ever to meet the requirements of their many customers. Their new shops are located on Oxford St., between Masher and Handcock Sts., and are fitted up with the latest and most improved machinery which will enable them to turn out their product with even a larger degree of perfection and promptness than heretofore. The parts of the machine will be contracted for and made by outside parties under special contracts and guarantees, but the assembling of the parts into the complete machine will be done at their new works, which will be entirely under their own supervision and control, by which the management will be in a position to guarantee the workmanship to a higher quality than heretofore. Besides conducting the general business of building and assembling they will pay particular attention to a general repair business for custom-

ers and machine work in general.

With the new location they will be in close proximity with the trade, and are already much encouraged by the many expressions and letters received from their list of customers. The business of this company under the present management is constantly on the increase and with their increased facilities, are now in a position to still further enlarge their business. Both Mr. H. E. Ashmore, the general manager, and Mr. W. P. Young, the superintendent will continue with the company, and under the very careful management of Mr. Ashmore, the business has grown to very enviable proportions.

A rather unfortunate report was circulated which might have caused this company some inconvenience, and we take pleasure in contradicting it; namely, to the effect, that owing to the fact of financial embarrassment falling to the lot of the company who had the contract to manufacture the parts of these machines, it was reported that the American Knitting Machine Co.'s business had very much deteriorated, and that there was a possibility that the company would not continue.

The American Knitting Machine Co. is in sound financial condition and were the sufferers only because their name was confused with the company who manufactured their parts and had no connection with them outside of the fact that they were builders of their parts. It is with much pleasure therefore that we take this opportunity to inform the knitting trade in general that the American Knitting Machine Co. is in good financial shape and that they are in a better position than ever not only to produce their machines in larger quantities, but also with a marked improvement in the quality of the material entering into them, and also in the workmanship upon them. We congratulate the American Knitting Machine Co. on their latest move, and feel sure that it will result in mutual benefit not only to them, but to the trade interested.

The Asala Stop Motion.

The new filling stop motion which the Asala Company is bringing out finds many admirers, and we are informed that numerous orders for same are being placed, many of which are being received from woolen and worsted manufacturers.

New Accounts.

The well known firm of commission merchants, The Putnam-Hooker Company of Cincinnati, Chicago, St. Louis and New York, have recently added to their list the accounts of the following mills, for which they will be the sole selling agents: Itasca Cotton Mfg. Co., Itasca, Texas; Enterprise Cotton Mills, Enterprise, Ala.; Floyd Cotton Mills, Rome, Ga.; The Lincoln Cotton Mill Company, Evansville, Ind.

Lakewood's Fall Season.

With the passing of the summer and the farewells to September there comes as a ruling thought in the minds of resorters, the choice of a point of healthful and advantageous location for the winter, and, more immediately, for the months of early fall, when summer places of entertainment are closed and cold weather resorts have not yet opened. To the family the problem is a particularly weighty one for the schools all over the country are opening for the year, and it is time the little people took up the business of childhood. And in making choice there are to be considered as factors, healthfulness, accessibility to business centres, the character of diversions, and social surroundings.

It is true that Lakewood very largely owes its leading place among resorts to the peculiar points which are most valued at midwinter—warmth, shelter and mildness of climate—and yet, in all its eight months' season, from fall to spring, there are no more perfect months than October and November.

For more than twenty years the first day of October has been the date on which Lakewood has opened its doors to the outside world, and that first day's registrations have been uniformly large, including travelers from mountain and seashore, and returning cottagers anxious to get settled again in their Lakewood homes after a summer's wanderings. All through the above named months the habit of out-door life which governed the hot weather season is prolonged in Lakewood, and the golden days of color which imperceptibly pass into frosts and chill of winter are rich in opportunities for sport and exercise on the golf links, the lake and in the woods. If you have never enjoyed the experience, try Lakewood early in its season.

A booklet on Lakewood will be sent free by C. M. Burt, G. P. A., New Jersey Central, New York City.

Sizing for Cotton Warps.

As a sizing for cotton warps many manufacturers think that nothing gives better satisfaction than "Sizeoleum," manufactured by the Arabol Manufacturing Company, 100 William Street, New York, especially when mixed with Arabol starch, corn or potato starch. It is also highly recommended for use on print cloth warps, sheetings and domestics.

Nothing Succeeds Like Success.

In the introduction of any new thing in the machinery line, there is first the stage when it has to be put out on trial and subjected to criticism from that class of people whose disposition is always to condemn a new thing because it is new and because they do not want to make a change. It will receive the condemnation of manufacturers of competing goods or those whose product will be displaced, and it often happens that some slight defects in construction are brought to light by actual mill tests and made much of. The first year is apt to be one of great discouragement, and a machine builder is lucky if he sees light ahead in that time. The second year is a little better, and then, if it is a good thing and persistently pushed, there comes a turn in the tide, and sometimes a tidal wave.

That is happening now to the business of L. T. Houghton, of Worcester, Mass., the manufacturer of steel thread boards, steel rails and guides for spinning and twisting. Mr. Houghton knew he had a good thing, and has been persistently at work convincing manufacturers that he has, in spite of the strongest opposition, and although he had no reason to complain at the volume of business since he first put his board on the market, the orders and re-orders are now coming in in large quantities. We understand that he now has orders on his books for about half a million spindles, which include not only those specified for new frames, but many from mills changing over their wood thread boards to steel, as experience has demonstrated to spinners that the time saved in doffing is in most instances sufficient to defray annually the whole cost of making change.

The latest order received was from the Fall River Iron Works for about 300,000, changed from wooden to the Houghton steel boards and steel rails in mills Nos. 1, 2, 3 and 4. The Canadian Colored Cotton Mills at Cornwall are to change their thread boards. The Orr Cotton Mills and the new Brogan Cotton Mills in the South have specified that their frames shall be equipped with the Houghton steel board. The Arlington Mills, of Lawrence, and the Fulton Bag & Cotton Mills, at Atlanta, are to have also the Houghton metal rail.

The capacity of Mr Houghton's shop is now taxed to its utmost, and he is contemplating an enlargement.

John B. Stetson Company's Silk Department

It may not be generally known that the great hat manufacturing concern of John B. Stetson Company of Philadelphia has its own weaving department, which produces on an average 40,000 yards per week, all of which is consumed in the trimming of Stetson's hats. It is run entirely by electrical power, each machine being operated by an individual motor. The looms are of special design and built in their own mechanical department. They are very high speeded. The Universal system of doubling or twill winding is used. There are nine braiders, five spoolers, thirteen warp mills, seventeen looms and about sixty hands are employed. The company buys the raw silk, and has it thrown on commission, and with the exception of dyeing, does all of the rest of the processes itself. Under the management of Mr. Maynard this department has grown very rapidly, and four new looms of their special construction are being built and will be in operation the first of the year, increasing production probably to 60,000 yards per week.

Moved Across the Street.

Edward S. Hyde, who has long been located at 223-225 Chestnut St., Philadelphia, has moved his offices and store across the street to No. 226, where he has improved facilities for handling his large yarn business. Mr. Hyde makes a specialty of knitting and weaving yarns of all kinds and represents many of the best eastern and southern mills.

National Association of Woolen and Worsted Overseers.

This association held its 21st annual meeting at the American House, Boston, Mass., on Nov. 18. A large number were present when the meeting was called to order in the hotel parlors. Following is a list of the new members elected: Richard J. Hackett, Ware, Mass.; Daniel Sullivan, Oxford, Mass.; Francis J. Dorsey, Cherry Valley, Mass.; Alexander Murray, Claremont, N. H.; William R. Shanks, Raritan, N. J.; A. L. Tainter, Stafford Springs, Conn.; George A. Stevens, Hinsdale, N. H.; William K. Litch, Uxbridge, Mass.; Claude Whittle, Methuen, Mass.; Thomas Mullin, Franklin Falls, N. H. Associate member, W. E. Newbert, Boston, Mass.

After the reports of the treasurer and secretary had been read the following officers were elected for the coming year: T. W. Biddles, Potter Hill, R. I., president; S. Walker, Uxbridge, Mass., first vice-president; George Gerry, Maynard, Mass., second vice-president; T. N. Parent, Franklin Falls, N. H., third vice-president; Walter Pickford, Clinton, Mass., secretary; Albert E. Jones, Uxbridge, Mass., treasurer; George W. Burr, Ludlow, Vt., secretary of the Beneficiary Department; Albert E. Jones, Uxbridge, Mass., treasurer of the Beneficiary Department; John Thornton, Eleazer Davis and Louis Carmack, trustees. The retiring officers were Charles M. Hurst, president; Walter Pickford, secretary (re-elected); Albert E. Jones, treasurer (re-elected); M. C. O'Brien, first vice-president; T. W. Biddles, second vice-president; S. Walker, third vice-president; George W. Burr, secretary of the Beneficiary Department (re-elected); John Thornton (re-elected), Eleazer Davis (re-elected) and George Gerry, trustees.

Following is a list of the members present: Charles M. Hurst, Providence, R. I.; A. E. Jones, Uxbridge, Mass.; Walter Pickford, Clinton, Mass.; S. Walker, Uxbridge, Mass.; J. H. L. Keegan, Uxbridge, Mass.; Charles I. Keegan, Uxbridge, Mass.; J. G. Burns, Providence, R. I.; E. G. Tainter, Warmesit, Mass.; Louis Carmack, Lymansville, R. I.; T. W. Biddles, Potter Hill, R. I.; T. J. Sexton, Franklin Falls, N. H.; John Came, Claremont, N. H.; W. E. Chamberlain, Nasonville, R. I.; Mark Tempest, Holyoke, Mass.; John H. Fitzroy, Fitchburg, Mass.; William H. Adams, East Rochester, N. H.; George A. Elliott, East Rochester, N. H.; Rudolph E. Anderson, East Rochester, N. H.; T. N. Parent, Franklin Falls, N. H.; Thomas Buchan, Hyde Park, Mass.; Thomas J. Rigney, Millbury, Mass.; T. W. Gerry, Maynard, Mass.; E. Davis, Plymouth, Mass.; James J. Rae, Cherry Valley, Mass.; Samuel H. Illman, Philadelphia, Pa.; Louis M. Allison, Worcester, Mass.; Asa Garth, Fitchburg, Mass.; E. T. Avison, Utica, N. Y.; Thomas Richmond, Killingly, Conn.; Andrew Smith, Kenyon, R. I.; R. E. Hovan, Ludlow, Vt.; E. Saxe, Boston, Mass.; J. W. Linnehan, Boston, Mass.; James Hall, Maynard, Mass.; C. M. Ellis, Putnam, Conn.; M. J. O'Brien, North Andover, Mass.; J. D. Price, Methuen, Mass.; M. C. O'Brien, Hyde Park, Mass.; Archibald Ormiston, Lawrence, Mass.; W. V. Philbrick, Worcester, Mass.; Herman Amback, Lymansville, R. I.; W. H. Hassett, Woonsocket,

R. I.; John D. Miskell, Boston, Mass.; S. S. Stiles, Middletown, Conn.; William A. Moulton, Walpole, Mass.; A. L. Tainter, Stafford Springs, Conn.; George W. Burr, Ludlow, Vt.; James H. Fielding, Worcester, Mass.; Joseph A. Bolger, Worcester, Mass.; James P. Kennedy, Millbury, Mass.; William E. Davison, Hinsdale, N. H.; Everett S. Eddy, Worcester, Mass.; John J. Henderson, Cordaville, Mass.; Craven Midgley, Lowell, Mass.; David McTaggart, Worcester, Mass.; A. S. Taylor, Lowell, Mass.; R. Fisher, Philadelphia, Pa.

The Dunn Flyer Taking Well.

In the September issue of this year appeared an illustration of the new Dunn Flyer, which is manufactured by the Textile Machinery Co., 50 State St., Boston, Mass. This flyer embodies new principles in flyer construction, and advantages which are demonstrated in actual operation. Since the flyer has been presented to the trade, the builders have received not only a large number of letters and inquiries from the mills through the United States who are interested in the subject, but also a number of good substantial orders for flyers from some of the most representative mills throughout the country, and from many they have already received repeat orders.

In addition to the mills in this country which they have already equipped they are in communication with mills through Canada, Mexico, and even a number of inquiries from abroad. Many mills speak very highly of the efficiency of this flyer, and of the satisfactory results received.

Among those which the mills look upon with most favor are the facts that the roving can be run with less tension, no trouble being experienced by the ends flying out of the arm; also, that a larger bobbin can be built within the same space, resulting in longer time between doffs.

In the matter of running fine work it is proving of great value, as a change from coarse to fine roving can be made on a 7-inch lift without entailing any change in the flyer.

If there is any information desired beyond what appeared in the article, the Textile Machinery Co., at 50 State St., Boston, will be glad to furnish further particulars.

Removal.

After December 1st the Boston office of the Cassella Color Co. will be at 68 Essex St., Room 24.

The August Fels Collection.

At the last meeting of the board of trustees of the Lowell Textile School, an offer by Mr. August Fels of Lowell to donate to the Lowell Textile School his entire collection of woolen fabrics, was received. Mr. Fels has been assembling this collection through many years. It represents not merely a large outlay of money but a considerable expenditure of energy and time in making the collection so complete and in mounting and tabulating the specimens. There are thousands of samples of woolen cloth of all weights and of a great variety of ancient and modern designs, both foreign and domestic, comprising many grades of stock and conditions of finish.

The samples will be mounted and kept at the school for the benefit of the students in the study of textile designs.

It was voted to accept the offer and to extend the thanks of the corporation to Mr. Fels for this very generous and invaluable collection of designs and samples and that it be set apart and designated as the "August Fels Collection."

The New York Corduroy Mill, New York City, N. Y., which has been selling its high grade corduroys through Clyne & Ringe department of H. A. Caesar & Co., will hereafter sell direct to the trade.

Health in Lakewood.

A score and more of years ago Lakewood secured its first notice from the outside world as a health resort. It has long since outgrown, or rather improved upon that classification, having secured recognition as the chosen rallying point for those seeking rest, change, exercise and open-air life, or social pleasure and relaxation. But there are yet many of her older citizens who can recall the long-ago presence of invalids who spent hours among the pines, whittling pine branches and chewing pine shavings, invariably crediting their return to health to such processes.

While it is true that Lakewood air is a most pleasant blend of temperate mildness and balsamic fragrance, it would probably be going too far to claim for it any particular medical properties. The place is laid out upon a light and sandy soil which speedily absorbs all moisture; the air is dry and untainted; the system of drainage is modern, and the water supply is from artesian wells six hundred to seven hundred feet deep. As to temperature, there is a comparative warmth of eight to ten degrees over New York City, sixty miles away, doubtless due to the shelter of the pine forests which surround the place for miles.

What is a more direct factor of the healthful conditions found here by visitors is a total variance of habit which in Lakewood keeps out of doors people who are indoors when at home. The world is not roofed over here. Men and women who come here physically out of tune, play at golf, drive, ride or walk; breathe pure air, exercise comfortably, and sleep well.

And good health comes as a logical result. Life in the open was ever a healthy life, and the man or woman of the city, tied down to a daily regime of close office hours or social obligations which are exacting and wearying, comes here to change all these habits and live naturally.

A postal to C. M. Burt, General Passenger Agent, New Jersey Central, New York City, will secure for you a Booklet on Lakewood. Send for it, it will be worth your while.

The New Crompton-Thayer Loom Company Ready for Business.

The textile trade will be interested to learn that a new loom company is in the field and ready for business. It is the Crompton-Thayer Loom Company of Worcester, Massachusetts, which was formed in that city last spring, and has since been working steadily to prepare for the market fancy worsted, woolen, silk and cotton looms, dobbies, box motions, and kindred parts and mechanisms.

The company has adopted essential and improved mechanisms of the various fancy looms mentioned, but has adapted to the well known and standard features, new ideas and improvements which will mark, they believe, a distinct stride forward in the building of fancy weaving machinery. The new devices are all in the direction of simplification. Many of them show great ingenuity, and it is claimed will tend to make the looms easier to operate, easier to keep in operation, and in the event of breakage, easier to repair.

Their new features are designed to reduce the number of parts and while all parts of the looms which usage has shown receive the greatest strain have been reinforced to an unusual degree and regardless of cost this reduction of parts and the great care taken in designing has, it is claimed, made possible the production of looms of great strength, simplicity and symmetry.

The company is now ready to take orders for dobbies of any capacity up to thirty harnesses, and the new silk loom which, after the severest trial in the testing room, has shown great speed and strength, is now ready for inspection at the works on Cambridge Street, Worcester. This loom is of remarkable beauty of design, and its action fulfills the promise of its appearance. The company can now promise early delivery of plain and dobby silk looms, and also on looms of any width to be run with Jacquards. By the early part of the year they expect to have ready for exhibition full fancy worsted and woolen looms, which they will be ready shortly thereafter to supply in any harness capacity and in any width desired.

The new company, soon to be incorporated with ample capital, has been working as a firm, consisting of George Crompton, Edward D. Thayer, William B. Scofield, and Randolph Crompton, and these gentlemen will be the directors of the corporation. Mr. George Crompton was for several years a director of the original Crompton Loom Works, and later for several years was a director and the treasurer of the Crompton & Knowles Loom Works. Mr. Edward D. Thayer has long been known in the woolen trade and is today one of the largest individual manufacturers of woolen goods in the United States. Mr. William B. Scofield was formerly treasurer and general manager of the Worcester Thread Company, which recently sold its business to the Linen Thread Company of America. Mr. Randolph Crompton was a director of the old Crompton Loom Works, and later a vice president, director, member of the executive committee and assistant superintendent of the Crompton & Knowles Loom Works, having active charge for a considerable period of the Crompton Works of the combined companies, which employed about one thousand men.

The Crompton-Thayer Loom Company is in Worcester, which has been the home of the fancy loom business of America ever since the late George Crompton founded the Crompton Loom Works more than half a century ago, to build the first fancy power loom, the invention of his father, William Crompton. The skill of Worcester mechanics is unexcelled and its superintendent, designers and foremen are all men who have been trained for years in the loom business.

The company's works are in the Crompton Associate shope on Cambridge Street, in Worcester, which they have fitted up with the best machinery.

Low Rates to Montreal, Quebec, St. Hyacinthe and Sherbrook via Boston & Maine Railway.

A mid-winter trip to Canada! Imagine it! An opportunity to visit the famous old cities of Montreal, St. Hyacinthe, Sherbrooke or Quebec in the winter season at low rates is what the Boston & Maine Railroad offers commencing December 28th. Indeed, the person who contemplates a vacation in the winter time can choose no better place. During December and January the fun of the Canadian winter is at its height. The great winter sport, hockey, is having full swing; the curling matches, exciting and thrilling, are engaged in by both men and boys: the popular toboggan slides are alive with adults and children; while sport and necessity call in the use of the celebrated snow-shoes. Skating races are daily occurrences; the ponds and rivers are thronged, and the merry jingle of the sleigh-bells is heard. All these are every-day scenes during the winter in Canada. This year more than ever, sports and enjoyments for the visitors will be looked after; and Quebec has already mapped out a program. It is the idea of the larger cities to add to their natural endowments attractions which will make them popular as winter resorts. The sharp, piercing air has an invigorating effect, a healthful frigidity, which will be appreciated.

In Montreal the beautiful churches are gorgeously decorated after Christmas, and also in preparation for the great Canadian festival, New year's when a joyful season commences. Notre Dame and St. James are the principal churches, and indeed they are magnificent edifices. Mt. Royal, overlooking the city of Montreal, is a great visiting place for tourists. Sherbrooke, P. Q., is an interesting Canadian city, not so well known nor so large as Montreal, but like St. Hyacinthe, a typical French town.

Quebec, noted as America's most famous stronghold, is one of the most interesting cities on the continent. The visitor always journeys to the fortifications on the "Plains of Abraham," where the noted Generals, Montcalm and Wolfe, gave up their lives. The churches are beautiful and the famous shrine, St. Anne De Beaupre, is only a short ride from the city.

Don't miss the opportunity to visit these cities. The rates are greatly reduced, almost one-half, for the round trip from Boston and many principal stations. The hotels are all first class and amply well prepared to take care of all visitors.

Tickets are good going December 28th to 31st,

inclusive; returning in time to arrive at destination not after January 25th. For list of rates and stations, see Boston & Maine posters or inquire of D. J. Flanders, General Passenger and Ticket Agent.

R. H. Hood Removes to Larger Quarters.

R. H. Hood, manufacturer of worsted machinery, repairs, etc., also fluted rollers, fallers and all sorts of supplies pertaining to worsted machinery, has consolidated his works formerly located at 1420 Callowhill St. and 1213 Day St. and is now located at 1842-44-46 Germantown Ave., where all negotiations and shipments should be addressed. In his new quarters he has more space and better equipment.

E. A. Leigh Removes to New Offices.

Mr. E. A. Leigh, importer of textile machinery, etc., is removing from 35-36 Mason Building to larger and more convenient offices at 232 Summer St., opposite the South Station, Boston.

Not Thrown Away.

Williamstown Station, Mass., Nov. 27, 1903.
Lord & Nagle Co., Boston, Mass.

Gentlemen:—I enclose $2.00 for my subscription to Nov. 1904. I enjoy your instructive paper very much and hope it will continue to keep its high standard. I don't think any of your subscribers destroy their World-Records, but preserve them for future reference, thus making a first class textile library.

I have heard several satisfactory comments regarding the reception room and its interesting contents, and your kindness in extending such hospitality to your subscribers and advertisers in your new quarters.

Wishing the World Record every success, I am,
Yours truly,
R. W. B.

Recent Textile Patents.

BALE TYING Attachment for Compressors. 743,520. John H. Kennedy, Savannah, Ga., assignor to Aaron F. Churchill, Savannah, Ga.

CARD PUNCHING or Stamping Machine. 742,789. Walter W. Hodgson, Philadelphia, Pa., assignor of two-thirds to William E. Beatty and Fred Sutcliffe, Philadelphia, Pa.

CLOTH DRYING Machines. Presser Wheel for the Chains of. 743,990. Joseph J. Scholfield, Providence, R. I.

CLOTH TREATING Machine. 744,744. David Gessner, Worcester, Mass.

COLLAR OR CUFF. Woven. 745,305. Alfred L. Willard, Paris, France.

COTTON WASTE. Apparatus for Treating. 743,813. Robert R. Boyd, Memphis, Tenn.

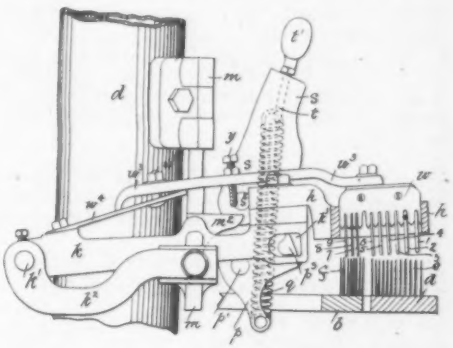
COTTON WASTE. Treating. 743,814. Robert R. Boyd, Memphis, Tenn.

DYEING APPARATUS. 744,147. James A. Willard, Chattanooga, Tenn., assignor to Vacuum Dyeing Machine Co., Chattanooga, Tenn.

FABRIC CUTTING and Folding Machinery. 743,061. Edgar H. Cottrell, Stonington, Conn., assignor to C. B. Cottrell & Sons Co., New York City.

COMBING MACHINE. 742,425. Ishmael Hey, Lower Laithe, England.

This invention consists in improved means for forcing the fibrous substances upon the pins or teeth of the circular combs, said means comprising loosely-mounted blades mounted upon bearings or supports which are adapted to yield to permit all



of the blades to move entirely clear of the pins or teeth of the combs.

INTERLOOPED FABRIC. 742,700. Friedrich Maussner, Philadelphia, Pa., assignor to American Interlaced Horse Collar Company.

LOOM. 743,723. William Holcroft, Chester, Pa.

LOOM. 744,442. Ernest Vahle, West Hoboken, N. J.

LOOM BATTEN Operating Mechanism. 744,843. Charles W. Widerstrom, Georgetown, Conn., assignor to the Gilbert and Bennett Mfg. Co., Georgetown, Conn.

LOOM BOX Motion. 744,682. George Goodline, Philadelphia, Pa.

LOOM BOX Pattern Mechanism. 742,817. Frederick A. Guillette and Henri A. Guillette, Taunton, Mass., assignors to Crompton and Knowles Loom Works, Worcester, Mass.

LOOM DOBBY Leno Motion. 743,675. Henry Bardsley, Providence, R. I., assignor to Crompton & Knowles Loom Works, Worcester, Mass.

LOOM FILLING Detecting Mechanism. 742,564. Arthur E. Benson, New Bedford, Mass., assignor to Draper Co., Hopedale, Mass.

LOOM FRICTION Let-Off. 745,121. Herbert Taylor, Blackburn, England.

LOOM. LAPPET. 744,307. Frederic J. Dearden and George S. Sharp, New Bedford, Mass., assignors to Crompton & Knowles Loom Works, Worcester, Mass.

LOOM LET-OFF Mechanism. 744,941. Chas. F. Roper, Hopedale, Mass., assignor to Draper Co., Hopedale, Mass.

LOOMS. Means for Preventing Banging-Off in. 742,813. Everett S. Wood, Hopedale, Mass., assignor to Draper Co., Hopedale, Mass.

LOOM. Multiple Harness. 743,333. David Robinson, Pawtucket, R. I., assignor to Draper Co., Hopedale, Mass.

LOOM MULTIPLIER Mechanism. 742,404. Willie G. Eaton, Nashua, N. H., assignor to Crompton and Knowles Loom Works, Worcester, Mass.

LOOM. NEEDLE. 743,107. Eppa H. Ryon, Worcester, Mass., assignor to Crompton & Knowles Loom Works, Worcester, Mass.

LOOM PICKER Stick Connection. 745,143. Joseph A. Bottomley, Norwich, Conn.

LOOM PICKER Motion. 744,862. Harry L. Goodwin, Worcester, Mass., assignor to Benjamin M. Pevey, Worcester, Mass.

LOOM PICKER Stick Safety Fastener. 742,695. Henry W. Marcy, Utica, N. Y.

LOOM PROTECTIVE Mechanism. 744,324. William A. Fowler, Salisbury, N. C., assignor to Draper Co., Hopedale, Mass.

LOOM SHUTTLE Binder. 742,607. Francis A. Mills, Lawrence, Mass., assignor of one-half to Grosvenor B. Emmons, Methuen, Mass.

LOOM SHUTTLE Box Operating Mechanism. 744,683. George Goodline, Paterson, N. J.

LOOM SHUTTLE Box Operating Mechanism. 744,333. George Goodline, Paterson, N. J.

LOOM SHUTTLE Checking Mechanism. 743,880. Joshua P. Johnson, Brunswick, Me.

LOOM SHUTTLE Motion. 743,123. William H. White, Burrillville, R.I.

LOOM STEEL Harness Motion. 744,910. Clare H. Draper, Hopedale, Mass., assignor to Draper Co., Hopedale, Mass.

LOOM TAKE-UP Mechanism. 743,584. Wallace I. Stimpson, Hopedale, Mass., assignor to Draper Co., Hopedale, Mass.

LOOM TAKE-UP Roller. 743,657. Frederick Ott, Woonsocket, R. I.

LOOM WARP Beam. 745,211. Nicholas J. Martin, Taunton, Mass.

LOOM WARP Stop Motion. 744,940. Chas. F. Roper, Hopedale, Mass., assignor to Draper Co., Hopedale, Mass.

LOOM FOR WEAVING Figured Double Pile Fabrics. 743,943. John W. Smith, Amsterdam, N. Y.

LOOM WEFT Controlling Mechanism. 743,292. Frederic E. Kip, Montclair, N. J.

LOOM WEFT Detecting Mechanism. 743,166. George F. Hutchins, Worcester, Mass., assignor to Crompton & Knowles Loom Works, Worcester, Mass.

LOOM. WEFT Replenishing. 744,240. William Rossetter and Richard Talbot, Blackburn, England.

LOOM WEFT Replenishing Mechanism. 745,078. Alfred Smith, Simeon Jackson and Charles Hudson, Keighley, England.

LOOM WHIP Roll Motion. 743,722. William Holcroft, Chester, Pa.

MEASURING DEVICE for Looms. Cloth. 743,989. Leonard M. Phelps, Blackstone, Mass.

SHUTTLE BOX Motion. 744,273. John S. Ainley, Hudderfield, England.

SHUTTLE DRIVING Mechanism. 744,037. Charles E. Brouillette, Woonsocket, R. I.

SPINNING AND DOUBLING Apparatus. 742,822. Thomas Ashworth, Urmston, England, assignor of one-half to Joseph Shaw Gaunt, Manchester, England.

SPINNING AND DOUBLING Apparatus. 742,554. Thomas Ashworth, Urmston, near Manchester, England, assignor of one-half to Joseph Shaw Gaunt, Manchester, England.

C. E. RILEY & CO.

65 Franklin Street, BOSTON, MASS.

BUILDERS AND IMPORTERS OF

COTTON WOOLEN WORSTED

MACHINERY

AGENTS FOR

HOWARD & BULLOUGH, Ltd., Picking, Revolving Flat Cards, Electric and Mechanical Stop Motion Drawing, Slubbing, Intermediate, Roving and Jack Frames, Spinning and Twisting, New Patent Self-Acting Mules, Spoolers, Warpers and Slashers,

RICHARD THRELFALL, Patent Fine Spinning Mules, 100s to 350s.

HALL & STELLS, Worsted Machinery.

CONSTRUCTION DE MACHINES, Ci-Devant, F. J. Grun. French Worsted Machinery.

HOYLE & PRESTON, Noble Combs, Back Washing Machines, etc.

JAMES TOMLINSON, Ltd., Cotton Waste Machinery; Engine Cleaning and Hard Waste Breaking Machines, etc.

JOHN HAIGH & SONS, Ltd., Woolen and Worsted Cards, Fearnoughts, Feeds, etc,

THOS. BROADBENT & SONS, Hydro Extractors, Patent Suspended Steam and Electrical Driven, Machines kept in stock in Boston.

JOHN WHITELEY & SONS, Card Clothing for Cotton; Tempered Steel, Plough Ground, Needle Pointed.

L. M. TETLOW & SONS, Card Clothing for Woolen and Worsted; Tempered Steel, Needle Pointed.

J. GREENHALGH & SONS, Cotton Waste Willows, for Fly, Strips, Picker Droppings, etc.

DRONSFIELD BROS., Ltd., Grinding Rolls and Emery Filleting. Stock kept in Boston.

SPINDLES, FLYERS, FLUTED ROLLS, ETC.

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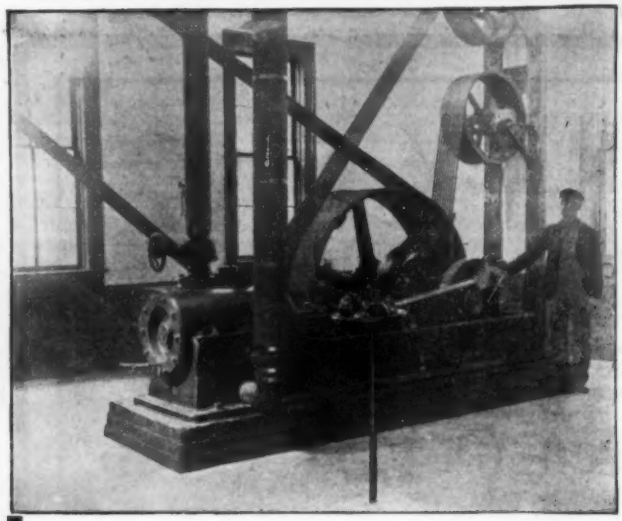

CLING SURFACE MFG. CO. WYANDOTTE, MICH.

I am glad to advise you regarding results of CLING-SURFACE especially in our rope drives.

We have two nine rope drives from 100 h. p. engine, inch rope used. One drive 92 ft. centers, the other 79 ft. centers.

We have used CLING-SURFACE over nearly a year and its result has been to penetrate into the rope, keeping it very pliable by surrounding each internal fibre with a lubricant and this has also prevented internal chafing of the fibres. It has protected the rope from influence of damp weather and has filled up the uneven outside surface until we have perfectly round cables, touching the pulleys at all points. Slipping is entirely prevented.

J. H. BISHOP CO., GILBERT GIRARDIN, Ch. Eng.
(Robes and Blankets.)

Cling-Surface for Rope Drives

There is nothing better than CLING-SURFACE for ropes.

It preserves them, keeps them pliable, elastic, waterproof and weather-proof.

And best, it penetrates in around every fibre, preventing the internal friction and chafing so severe on ropes.

It stops slipping and permits all ropes to run easy.

You can easily double a rope's life.

Order a can and try it. We guarantee every pound.

Cling-Surface Mfg. Co

199-205 Virginia Street
BUFFALO, N. Y.

Boston, 170 Summer St
New York, 39 Cortlandt St
Philadelphia, The Bourse

Universal

LUNKENHEIMER GLASS BODY OIL PUMPS

Fig. 495

Are easy to fill, attach and operate. Glass body shows stage of oil. Made in four sizes, holding ⅛, ¼, 1 pint, 1 quart of oil. The "Universal" can be attached either vertically or horizontally by transposing a plug and shank which are interchangeable. Oil Pump Fig. 495 can only be attached vertically. Both styles are of handsome design and highly finished, and warranted to satisfy. Specify "LUNKENHEIMER" make and order from your dealer. Write for catalogue of Superior Brass and Iron Steam Specialties.

THE LUNKENHEIMER CO.

Sole Makers and Patentees, CINCINNATI, OHIO, U. S. A.

BRANCHES: New York, 26 Cortlandt St. London, 35 Great Dover St.

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Buyers' Index.

The addresses of builders of mill machinery and dealers in mill supplies, whose names appear in the following classified index, may be found upon referring to their advertisement. The Alphabetical Index to advertisers follows this classified list. Buyers who are unable to find in these classified lists such machinery or supplies as they desire, are invited to communicate with the publishers, who can, in all probability, refer them to proper sources.

Advertisers whose names do not appear under desired headings will please notify the publishers. Such omissions are accidental, not intentional.

Accident Cabinets.
Putnam & Co.

Air Moistening System.
American Moistening Co.

Appraisers.
American Appraisal Co.

Architects and Mill Engineers.
Ballinger & Perrott.
Ferguson, John W.
Gray, Arthur F.
Patterson, H. C.
Stearns & Castor.
Suck, Adolph.

Asphalt and Concrete.
Warren Bros. Co.

Automatic Feeds for Cards.
Leigh, Evan A.

Automatic Feeds for Cotton and Wool.
American Drying Machinery Co.
Harwood, Geo. B. & Son.
Leigh, Evan A.
Philadelphia Drying Machinery Co.
Philadelphia Textile Machinery Co.
Schofield, Wm. Co.
Smith, Jas., Woolen Machinery Co.
Woonsocket Machine & Press Co.

Automatic Shuttle and Loom Attachments.
Asala Co.
Stafford, G. W. Mfg. Co.

Balling Machine.
North Chelmsford Machine Co.
Torrance Mfg. Co.

Bandings.
——See under Yarns.

Baskets.
Ballou Basket Works.
Lane, W. T. & Bro.
Morris & Co.

Belting.
Boston Belting Co.
Dodge Mfg. Co.
Jeffrey Manufacturing Co.
Keystone Leather Belting Works.
Main Belting Co.
Shults Belting Co.
Smith, Jas. Woolen Mach. Co.
——See also Mill Supplies.

Belt Cutters.
Luther, C. A. & Co.

Belt Dressing.
Cling Surface Mfg. Co.
Dixon, Jos. Crucible Co.
Keystone Leather Belting Works.
Stephenson Mfg. Co.

Belt Lacing Machines.
Diamond Drill & Machinery Co.

Bindings.
——See Tapes and Braids.

Bleaching Kiers.
Allen, Wm. & Sons Co.
Arlington Mch. Wks. (Arthur Birch, prop.)
Birch Bros. Co. (Somerville Mchn. Works).

Bleaching Materials.
Bosson & Lane.
Roessler & Hasslacher Chemical Co.

Block Cutting for Printing.
Atlas Copper Stamp Works.

Blowers and Blower Systems.
American Blower Co.
Barney Ventilating Fan Works.
Boston Blower Co.
Buffalo Forge Co.
Hartford Blower Co.
Mass. Fan Co.
Sturtevant, B. F. Co.

Bobbins, Spools, Shuttles, Etc.
Leigh, Evan A.
Murray, Chas. O.
New England Shuttle Co.
Sweet & Doyle.
Tebbets, E. L. & Co.

Boilers.
——See Steam Boilers.

Boiler Setting.
Harris, J. B.

Boxes, Cloth Boards, Etc.
Pearson, J. T.

Boxes (Paper).
——See Paper Boxes.

Braiding Machinery.
New England Butt Co.
Textile Machine Works.

Braids.
——See Tapes, Braids and Edgings.

Brass (Perforated).
——See under Perforated Metal.

Brushes.
Felton, S. A. & Son Co.
Mason Brush Works.

Brushers.
——See Napping Machines.

Burr Pickers.
Curtis & Marble Machine Co.
Sargent's, C. G., Sons.
Smith, Jas., Woolen Machinery Co.

Burlaps.
Stoddard, Haserick, Richards & Co.

Calico Printers' Machinery and Supplies.
Arlington Mch. Wks. (Arthur Birch, prop.)
Birch Bros. Co. (Somerville Mchn. Works).
Butterworth, H. W. & Sons Co.
Taunton, New Bedford, Copper Co.
Textile Finishing Mchry. Co.
——See also Dyeing, Bleaching, Machinery, etc.

Canvas Baskets.
Ballou Basket Works.
Lane, W. T. & Bro.
Morris & Co.

Carbonizing.
Riverdale Woolen Co.

Carbonizing Machinery.
American Drying Machinery Co.
Philadelphia Drying Machinery Co.
Philadelphia Textile Machinery Co.
Sargent's, C. G., Sons.
Smith, Jas. Woolen Machinery Co.

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Stoddard, Haserick, Richards & Co.

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Riley, C. E. & Co.
Smith, Jas. Woolen Machinery Co.
Stoddard, Haserick, Richards & Co.

Carders' Tools.
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Carpet Machinery.
Altemus, Jacob K.
Curtis & Marble Machine Co.
Howard Foundry & Mch. Wks.
Philadelphia Textile Machinery Co.
Smith, Jas., Woolen Machinery Co.

Castings.
Livermore, Homer F.
Schofield, Wm. Co.

Chemicals and Apparatus.
Fiedt, Geo. D. & Co.
Roessler & Hasslacher Chemical Co.

Cling Surface.
Cling Surface Mfg. Co.

Clocks.
Howard, E., Clock Co.
Riggs & Brothers.

Cloth Boards.
Chaffee Bros.
Pearson, J. T.

Cloth Stretchers.
Arlington Mch. Wks. (Arthur Birch, prop.)
Birch Bros. Co. (Somerville Mchn. Works).
Luther, C. A. & Co.

Clutches.
American Tool & Machine Co.
Dodge Mfg. Co.
Hunter, James, Machine Co.
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Smith, Jas. Woolen Machinery Co.
Smith, F. L.
Speed Changing Pulley Co.

Coal.
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Stoddard, Haserick, Richards & Co.
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Harris, J. B.

Commission Agents.
English-Greene Co.

Conveying Machinery and Chains.
Jeffrey Manufacturing Co.

Cop Tubes.
——See Paper Tubes.

Copper (Perforated).
——See under Perforated Metal.

Copper Print Rollers.
Taunton, New Bedford Copper Co.

Coppersmiths.
Beer, Paul.
Badger, E. B. & Sons Co.

Copper Work for Dyers.
Butterworth, H. W. & Sons Co.
Textile Finishing Machinery Co.

Cotton.
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Stoddard, Haserick, Richards Co.

Cotton Elevators.
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Cotton Machinery.
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Crompton-Thayer Loom Co.
Cohoes Foundry & Machine Co.
Curtis & Marble Machine Co.
Draper Company.
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Cotton Openers and Lappers.
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Stoddard, Haserick, Richards & Co.

Cotton Softeners.
Bosson & Lane.
Loos & Dilworth.

Cotton Waste.
Becker, C. W.
Blaisdell, Jr., Co., S.
Charles, W. B.

Crayons.
Dixon, Jos. Crucible Co.
Lowell Crayon Co.

Cutters for Knit Fabrics.
Kennedy, Thos. (Cutters, etc.).
Universal Cutter Co.

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Philadelphia Textile Machinery Co.
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Somerville Mach. Wks.
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Dust Collectors.
Allington & Curtis Mfg. Co.
Hartford Blower Co.
Philadelphia Drying Machinery Co.
Dyers, Bleachers and Finishers.
Blissville Mills.
Brophy's, T., Sons.
Cold Spring Dyeing & Bleaching Co.
Cooper Mercerizing Co.
Cranston Worsted Mills (yarns).
Davidson, J. F.
Firth & Foster Co.
Greenwood, R. & Bault.
Home Bleach & Dye Works.
Ingrahamville Dye Works.
Keystone Fast Black Dye Works.
Leigh, Evan A.
Lorimers, The Wm. H. & Sons Co.
Molt Bros. (Indigo Blue).
Pawtucket Dyeing & Bleaching Co.
Pennypack Yarn Finishing Co.
Providence Mills Mfg. Co.
Rowland, Samuel.
Whittier Mills.
Wild, Chas. E.
Dyeing, Drying, Bleaching and Finishing Machinery.
American Blower Co.
American Drying Machinery Co.
American Yarn Dyeing Machine Co.
Antisdel, E. M. (Knit Dryer).
Arlington Mch. Wks. (Arthur Birch, prop.)
Birch, Arthur, Arlington Machine Works.
Birch Bros. Co. (Somerville Mchn. Works).
Buffalo Forge Co.
Butterworth, H. W. & Sons Co.
Curtis & Marble Machine Co.
Dubois, A. N.
Empire Laundry Machinery Co.
Entwistle, T. C., Co.
Fabric Measuring & Packaging Co.
Fairmount Machine Co.
Gessner, David.
Hartford Blower Co.
Heathcote, John & Son.
Hopkins Machine Works.
Howard Foundry & Mch. Wks.
Kenyon, D. R. & Son.
Klauder-Weldon Dyeing Machine Co.
Leyland, Thos. & Co.
Merchants Dyeing Co.
Philadelphia Drying Machinery Co.
Philadelphia Textile Machinery Co.
Rothe, O. & P., Man. & Supply Co., Ltd.
Smith, Drum & Co.
Smith, Jas., Woolen Machinery Co.
Somerville Machine W'ks, Birch Bros. Co.
Sturtevant, B. F. Co. (Drying).
Textile Finishing Machinery Co.
Dye House Cans.
Hill, James, Mfg. Co.
Dye Sticks.
Bailey, Frank.
Haedrich, E. M.

Dyestuffs and Chemicals.
Atteaux, F. E. & Co.
Berlin Aniline Works.
Bischoff & Co.
Bosson & Lane.
Cassella Color Co.
Dilion & Co.
Dubois, A. N.
Farbenfabriken of Elberfeld Co.
Ford, J. B., Co.
Fortner, L. B.
Geigy Aniline & Extract Co.
Geisenheimer & Co.
Holliday & Sons, Ltd.
Johnson, Chas. A. & Co.
Kuttroff, Pickhardt & Co.
Leyland, Thos. & Co.
Metz, H. A. & Co.
Molt Bros. (Indigo Blue).
N. Y. & Boston Dyewood Co.
Roessler & Hasslacher Chemical Co.
Selling Co., The.
Solvay Process Co.
Sykes & Street.
Thayer, Ed. M.
Vila, H. S.
Wild, Charles E.
Dynamos and Motors.
General Electric Co.
Sturtevant Co., B. F.
Edgings.
——See Tapes, Braids and Edgings.
Electrical Construction.
General Electric Co.
Electric Fans.
American Blower Co.
Buffalo Forge Co.
General Electric Co.
Hartford Blower Co.
Mass. Fan Co.
Philadelphia Drying Machinery Co.
Philadelphia Textile Machinery Co.
Sturtevant Co., B. F.
Electric Lighting.
General Electric Co.
Electric Motors.
General Electric Co.
Sturtevant Co., B. F.
Electrotyping and Printing.
Smith Bros.
Whitcomb, H. C. & Co.
Elevators.
Cohoes Foundry & Machine Co.
Howard Foundry & Mch. Wks.
Jeffrey Manufacturing Co.
Morse, Williams & Co.
Salem Elevator Works.
Employers Time Recorders.
Riggs & Brothers.
Exhaust Heads.
Burt Manufacturing Co.
Hartford Blower Co.
Pittsburg Gage & Supply Co.
Sturtevant, B. F., Co.
Fans—Exhaust and Ventilating.
——See Ventilating Apparatus.
Feed Water Heaters.
Green Fuel Economizer Co.
Scaife, W. B. & Sons.
Feed Water Pumps.
Goulds Mfg. Co.
Pittsburgh Gage & Supply Co.
Scaife, W. B. & Sons.
Feeds.
——See Automatic Feeds.
Filters.
Norwood Engineering Co.
Phila. Water Purification Co., The.
Pittsburgh Gage & Supply Co.
Scaife, W. B. & Sons.
Finishing Machinery.
——See Dyeing, Drying, Bleaching and Finishing.
Fire Brick.
Borgner, Cyrus, Co.
Fire Extinguishers.
Badger, E. B. & Sons Co.
Fire Hose.
Boston Belting Co.
Fire Hydrants.
Norwood Engineering Co.
Fire Proof Doors and Windows.
Lupton's, David, Sons Co.
Flax, Tow, Hemp and Jute Machinery.
Lawson, Samuel & Sons.
Leigh, Evan A.
Fluted Rolls.
Baker Machine Co.
Hood, R. H.
Leigh, Evan A.
Riley, C. E. & Co.
Thurston, A. G. & Son.
Flyers.
Baker Machine Co.
Leigh, Evan A.
Textile Machinery Co.
Forges.
Buffalo Forge Co.
Sturtevant Co., B. F.
Friction Clutches.
——See Clutches.
Friction Cones.
Evans, G. Frank.
Fuel Economizers.
Green Fuel Economizer Co.
Furnace for Boilers.
Harris, J. B.
Fulling Mills for Woolen Goods.
Hopkins Machine Works.
Hunt, Rodney, Machine Co.
Hunter, Jas., Machine Co.
Kenyon, D. R. & Son.
Garnetts.
Leigh, Evan A.
Philadelphia Textile Machinery Co.
Smith, Jas., Woolen Machinery Co.
Gas Engines.
Jones, Lewis.
Gas Exhausters.
Hartford Blower Co.
Sturtevant Co., B. F.
Gaskets (Rubber).
Boston Belting Co.
Gauges.
Crosby Steam Gage & Valve Co.
Lunkenheimer Co.
Pittsburgh Gage & Supply Co.
Standard Gauge Mfg. Co.
Gears.
Horsburgh & Scott.
New Process Raw Hide Co.
Gear Cutting Machine.
Whiton, The D. E., Co.
Generating Sets.
Buffalo Forge Co.
Sturtevant Co., B. F.
Heating.
——See Ventilating.
Heddles.
Smith, Jas., Woolen Machinery Co.
Stoddard, Haserick, Richards & Co.
Watson, L. S., Mfg. Co.
Hose.
Boston Belting Co.
Hosiery Boards.
Pearson, J. T.
Hosiery Labels.
Saranac Electrical Mfg. Co.
Hosiery (Winders).
Brigham, Arthur A.
Humidifying Apparatus.
American Air Moistening Co.
Hydro Extractors.
American Tool & Machine Co.
Brigham, Arthur A.
Riley, C. E. & Co.
Stoddard, Haserick, Richards & Co.
Textile Finishing Machinery Co.
Injectors.
Lunkenheimer Co.
Interior Telephone System.
Allen-Hussey Co.
Ironing Machines for Knit Goods.
Craw, J. W., Laundry Machinery Co.
Jacquard Cards.
Rogers Paper Mfg. Co.
Jacquards.
Halton's, Thomas, Sons.
Knit Goods, Edgings, Trimmings, Etc.
Cathcart, John & Co.
Chapin, Geo. W.
Charles, W. B.
Cheney Bros.
Friedberger Mfg. Co.
Hepner & Horwitz.
Krout & Fite Mfg. Co.
Weimar Bros.
Knit Goods Finishing Machines, Crochet, Etc.
Craw, J. W., Laundry Machinery Co.
Fink, John.
Merrow Machine Co., The.
Nye & Tredick Co.
Scott & Williams.
Union Special Sewing Machine Co.
Willcox & Gibbs Sewing Machine Co.

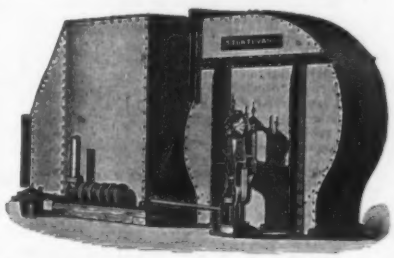
Alphabetical Advertising index, with page numbers, follows this list.

The rapid and positive circulation of warm air discharged from a

Sturtevant

Steam Hot Blast Apparatus

Insures Improved Drying of Cloth and Yarn in Special Dry Rooms



Also applied for Drying on tenter frames, for Knit-goods and Stockinets, and in connection with the oxidizing and ageing processes.

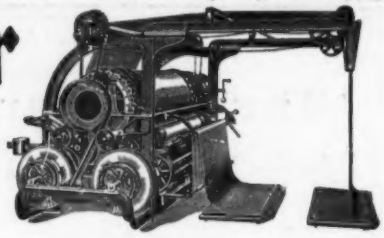
B. F. Sturtevant Co. Boston, Mass.

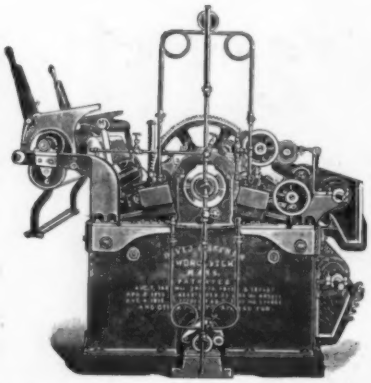
New York Philadelphia Chicago London

212

David Gessner

Worcester, Mass.

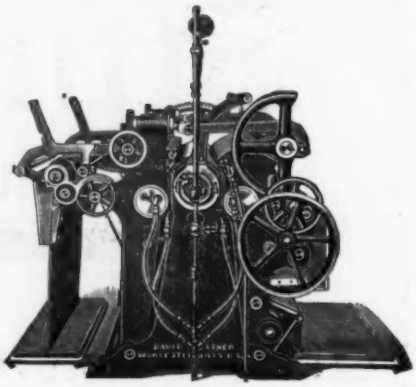




Latest Improved Cloth Finishing Machinery

—

Napping Machines and Presses a Specialty



Knitting Machine Cylinders.
Paxton & O'Neill.
Ruth Automatic Knitting Machine Co.
Stafford & Holt.
Stanton & Lewis.

Knitting Machinery.
American Knitting Machine Co.
Branson Machine Co.
Brinton, H. & Co.
Champion Machine Co.
Claes & Flentje.
Cooper, Chas.
Crane Mfg. Co.
Excelsior Knitting Machine Mfg. Co.
Hemphill Machine Co.
Irmscher & Co.
Jenckes, E., Mfg. Co.
Jones, Lewis.
Kennedy, Thos. (Cutters, etc.).
Keystone Knitting Machine Mfg. Co.
Lamb Knitting Mach. Mfg. Co.
Leighton Machine Co.
Lindley, Geo. W.
Mayo Knitting Machine & Needle Co.
McMichael, A.
McMichael & Wildman Mfg. Co.
Mueller, Arthur.
Muller, Julius.
National Automatic Knitter Co.
Nye & Tredick Co.
Paxton & O'Neill.
Pepper Machine Works.
Richter, Wolfgang.
Ruth Automatic Knitting Machine Co.
Schoebel, Walter
Scott & Williams.
Seyfert & Donner.
Stafford & Holt.
Standard Machine Co.
Taylor, James.
Tompkins Bros.
Walther, Otto.

Knitting Needles and Supplies.
Breedon's, Wm., Son.
Brinton, H. & Co.
Cooper, Chas.
Corey, Wm., Co.
Crane Mfg. Co.
Dodge Needle Co.
Freeman Bros.
Ives, Loyal T.
Keystone Knitting Machine Mfg. Co.
Lamb Knitting Machine Mfg. Co.
Manufacturers' Supplies Co.
Mayo Knitting Machine & Needle Co.
Page Needle Co.
Ruth Automatic Knitting Machine Co.
Treat, Orion.
Wardwell Needle Co.

Labeling Machine.
Saranac Electrical Mfg. Co.

Laboratory Outfits.
Feldt, Geo. D. & Co.

Leather Boards.
Rogers Paper Mfg. Co., Inc.

Lockers.
Narragansett Machine Co

Looms.
Asaia Co.
Crompton & Knowles Loom Works.
Crompton-Thayer Loom Co.
Draper Company.
Howard Fndy. & Mch. Wks. (For Wire).
Kilburn, Lincoln & Co.
Leigh, Evan A.
Lowell Machine Shop.
Mason Machine Works.
Smith, Jas., Woolen Machinery Co.
Stafford, George W. Co., The.
Stoddard, Haserick, Richards & Co.
Whitin Machine Works.

Loopers.
Beattie's Machine Works.
Hepworth, John W. & Co.
Leighton Machine Co.

Lubricators.
Dixon, Jos., Crucible Co.
Lunkenheimer Co.
Pittsburgh Gage & Supply Co.

Lumpers.
Gerry, George & Son.
Schofield, Wm. Co.

Machinery Dealers.
Jefferson, Ed. & Bro.
Lamb, J. K., Textile Mach Co.
Pittsburgh Gage & Supply Co.
Schofield, Geo. L.
Taylor, James.

Machinists' Tools.
Dodge Mfg. Co.
Whiton, The D. E. Co.

Mails.
Walder, J.

Measuring and Folding Machines.
Curtis & Marble Machine Co.
Elliott & Hall.
Fabric Measuring & Packaging Co.

Mechanical Draft.
American Blower Co.
Boston Blower Co.
Buffalo Forge Co
Hartford Blower Co.
Mass. Fan Co.
Sturtevant, B. F., Co.

Mechanical Engineers.
American Blower Co.
Buffalo Forge Co
Hartford Blower Co.
Sturtevant Co., B. F.
Suck, Adolph.

Mercantile Agency.
Dun, R. G. & Co.

Mercerizers.
Blissville Mills.
Brown, J. E. Cotton Wks.
Cooper Mercerizing Co.
Greenwood & Bault, R.
Home Bleach & Dye Works.
Lorimer, Wm. H. Sons Co.
Pennypack Yarn Finishing Co.

Mercerizing Machinery.
Arlington Mch. Wks. (Arthur Birch, prop.)
Birch Bros. Co. (Somerville Mchn. Works).
Butterworth, H. W. & Sons.
Klauder-Weldon Dyeing Machine Co.
Smith, Drum & Co.
Textile Finishing Machinery Co.

Mill Architects.
See Architects & Mill Engineers.

Mill Brushes.
See Brushes.

Mill Builders and Engineers.
Ferguson, John W.

Mill Sewing Machines.
—See Sewing Machines and Supplies.

Alphabetical Advertising Index, with page numbers, follows this list.

The New

Crompton-Thayer Loom Company

.. MANUFACTURERS OF ..

FANCY LOOMS

For Weaving Worsted and Woolen, Fancy Cottons and Silk Fabrics.

Dobbies, Box Motions and Supplies.

WORKS AND OFFICES:

677 Cambridge Street, Worcester, Mass.

Mill Supplies.
American Supply Co.
Bamford & Smith.
Barker, James.
Brigham, Arthur A.
Buckley's, Benj. Son, Gun Mill.
Crosby Steam Gage and Valve Co.
Dixon Lubricating Saddle Co.
Dodge Mfg. Co.
Easton-Burnham Co.
Hartford Blower Co.
Jefferson, Ed. & Bro.
Jeffrey Manufacturing Co.
Johnson Novelty & Mill Supply Co.
Keystone Leather Belting Works.
Lane, W. T. & Bro.
Leigh, Evan A.
Main Belting Co.
Morris & Co.
Murphy, E. W. & Co.
Pittsburgh Gage & Supply Co.
Putnam & Co.
Riley, C. E. & Co.
Russell, J. & Co.
Shaw, Victor, Ring Traveler Co.
Smith, Jas., Woolen Machinery Co.
Stephenson Mfg. Co.
Stoddard, Haserick, Richards & Co.
Sweet & Doyle.
Thurston, A. G. & Son.
Tucker, W. W. & C. F.
Ward & Vandegrift.
Walworth Manufacturing Co.
Watson, L. E., Mfg. Co.

Mill Trucks.
City Forge & Iron Works.
Townley, John T. Mfg. Co.

Napping Machinery.
American Napping Machine Co.
Borchers, Richard C. & Co.
Columbia Napping Machine Co.
Curtis & Marble Machine Co.
Gessner, David.
Jones, Lewis.
Leigh, Evan A.
Parks & Woolson Machinery Co.
Woonsocket Napping Machinery Co.

Noils (Silk).
Malcolm Mills Co.
Ryle, Wm. & Co.

Numbering Machines.
Force, Wm. A., & Co.

Oil Cups.
Lunkenheimer Co.
Pittsburgh Gage & Supply Co.

Oil Filters.
Burt Manufacturing Co.
Pittsburgh Gage & Supply Co.

Oils.
Loos & Dilworth.
Murphy, E. W. & Co.
New York & New Jersey Lubricant Co.
Stephenson Mfg. Co.

Oilless Bearings.
Arguto Oilless Bearing Co.

Oil Hole Covers.
Tucker, W. W. & C. F.

Overhead Tracks.
Cohoes Foundry & Machine Co.
Putnam & Co.

Overseaming Machines.
Champion Machine Co.
Merrow Machine Co.
Union Special Sewing Machine Co.
Willcox & Gibbs Sewing Machine Co.

Oxidizing Machinery.
Dubois, A. N.

Packing.
Boston Belting Co.

Paint.
Standard Paint Co.

Pantagraphs for Mill Engraving.
Johnson, C. A., & Co.

Paper Tubes.
Sayford Paper Specialty Co.

Patent Solicitors.
Crosby & Gregory.
Howson & Howson.
Siggers & Siggers.
Straley, Hasbrouck & Schloeder.

Perforated Metals.
Allis-Chalmers Co.
Beckley, A. J. & Co.

Peroxide of Sodium.
Roessler & Hasslacher Chemical Co.

Pipes and Fittings.
Pancoast, Henry B. & Co.
Walworth Manufacturing Co.

Pneumatic Conveying.
—See Ventilating.

Power Transmission.
Reeves Pulley Co.

Power Transmission Machinery.
Allis-Chalmers Co.
American Drying Machinery Co.
Cohoes Foundry & Machine Co.
Dodge Mfg. Co.
Evans, G. Frank.
Horsburgh & Scott.
Howard Foundry & Mch. Wks.
Hunter, Jas., Machine Co.
Jeffrey Manufacturing Co.
Kilburn, Lincoln & Co.
Pittsburgh Gage & Supply Co.
Philadelphia Drying Machinery Co.
Saginaw Manufacturing Co.
Schofield, Wm. Co.
Sellers, William & Co.
Smith, Jas., Woolen Machinery Co.
Speed Changing Pulley Co.
Textile Finishing Machinery Co.

Preparatory Machinery (Cotton).
Atherton, A. T., Mach. Co.
Howard & Bullough Am Machine Co.
Kitson Machine Co.
Leigh, Evan A.
Riley, C. E. & Co.
Saco & Pettee Machine Shops.
Smith, Jas., Woolen Machinery Co.

Press Boards and Fenders.
Rogers Paper Mfg. Co., Inc.

Pressers for Flyers.
Baker Machine Co.

Presses.
Boomer & Boschert Press Co.
Butterworth, H. W. & Sons Co.
Curtis & Marble Machine Co.
Gessner, David.
Hart, Charles.
Howard Foundry & Mch. Wks.
Miller Press & Machine Co.
North Chelmsford Machine Co.
Spence & Rideout.
Textile Finishing Machinery Co.
Woonsocket Machine & Press Co.

Pressure Regulators.
Crosby Steam Gage & Valve Co.
Mason Regulator Co.
Walworth Mfg. Co.

Alphabetical Advertising Index, with page numbers, follows this list.

A Sure Sign of Excellence

OUR TRADE MARK
ON
Belting, Hose, Packing,
Rubber Covered Rollers

BOSTON BELTING COMPANY
MANUFACTURERS
James Bennett Forsyth, Gen. Mgr.
BOSTON NEW YORK BUFFALO PHILADELPHIA ATLANTA

MECHANICAL RUBBER GOODS of every description.

Pulleys.
——See Power Transmitting Machinery.
Pumps.
Allis-Chalmers Co.
Goulds Mfg. Co.
Textile Finishing Machinery Co.
Pump Governors.
Crosby Steam Gage & Valve Co.
Mason Regulator Co.
Walworth Mfg. Co.
Purifying & Filtration Plants.
Kennicott Water Softener Co.
Norwood Engineering Co.
Scaife, W. B. & Sons.
Quillers.
Foster Machine Co.
North Chelmsford Machine Co.
Payne, G. W. & Co.
Rag Pickers.
Philadelphia Textile Machinery Co.
Schofield, Wm. Co.
Smith, Jas., Woolen Machinery Co.
Ramie Tops and Noils.
Tierney, Frank A.
Raw Hide Gears.
Horsburgh & Scott.
New Process Raw Hide Co.
Reed and Harness Manufacturers.
American Supply Co.
Walder, J.
Reels.
Luther, C. A. & Co.
North Chelmsford Machine Co.
Reducing Valves.
Crosby Steam Gage & Valve Co.
Mason Regulator Co.
Walworth Mfg. Co.
Regulators (Pressure).
Crosby Steam Gage & Valve Co.
Mason Regulator Co.
Walworth Mfg. Co.
Remnants.
Feingold, H. & D.
Ribbons.
Cheney Bros.
Ring Travelers.
National Ring Traveler Co.
Shaw, Victor, Ring Traveler Co.
Roofing.
Standard Paint Co.
Rope and Twine Machinery.
Brownell, G. L.
Garsed, W. R.
Haskell-Dawes Machine Co., The
Rope Transmissions.
Dodge Mfg. Co.
Roving Cans.
Hill, James, Mfg. Co.
Laminar Fibre Co.
N. E. Ventilating & Heating Co.
Walrus Fibre Mfg. Co.
Rubber Covered Rollers and Goods.
Boston Belting Co.
Rubberoid Roofing.
Standard Paint Co.
Saddles and Stirrups.
Dixon Lubricating Saddle Co.
Scales.
Sweet & Doyle.
Scallop Machines.
Merrow Machine Co.
Schools.
American School of Correspondence.
Lowell Textile School.
New Bedford Textile School.
Philadelphia Textile School.
Secondhand Machinery.
——See Mchry. Dealers also classified ads.
Screens (Perforated).
——See under Perforated Metal.
Selling Agents.
——See Commission Merchants.
Separators.
Draper Co., The
Sewing Machines and Supplies.
Arlington Mch. Wks. (Arthur Birch, prop.)
Birch Bros. Co. (Somerville Mchn. Works).
Champion Machine Co.
Curtis & Marble Machine Co.
Dinsmore Mfg. Co.
Fales, L. F.
Manufacturers' Supplies Co.
Somerville Machine W'ks, Birch Bros. Co.
Textile Finishing Machinery Co.
Union Special Sewing Machine Co.
Willcox & Gibbs S. M. Co.
Shafting, Hangers, Etc.
——See Power Transmission Machinery.
Shearing Machinery.
——See Dyeing, Drying, Bleaching and Finishing.
Sheet Metal Work.
Barney Ventilating Fan Works.
Hartford Blower Co.
Lupton's, David, Sons Co.
Shell Rolls.
Thurston, A. G. & Son.
Shoddies.
——See Wool Shoddies.
Shuttles.
——See Bobbins, Spools, Shuttles, Etc.
Silk Machinery.
Arlington Mch. Wks. (Arthur Birch, prop.)
Birch Bros. Co. (Somerville Mchn. Works).
Butterworth, H. W., Sons Co.
Leigh, Evan A.
Mason Machine Works.
Stoddard, Haserick, Richards & Co.
Textile Finishing Machinery Co.
Silk Mill Supplies.
Hall, I. A. & Co.
Singe Plates.
Arlington Mch. Wks. (Arthur Birch, prop.)
Birch Bros. Co. (Somerville Mchn. Works).
Butterworth, H. W., Sons Co.
Taunton, New Bedford Copper Co.
Singeing Machines.
Arlington Mch. Wks. (Arthur Birch, prop.)
Butterworth, H. W., Sons Co.
Curtis & Marble Machine Co.
Knapp, Charles H.
Leigh, Evan A.
Somerville Machine W'ks, Birch Bros. Co.
Smith, Drum & Co.
Textile Finishing Machinery Co.
Sizing, Starch and Gums.
Arabol Mfg. Co.
O. K. Soap Co.
Stein, Hirsch & Co
Skylights.
Drouve, G., Co.
Lupton's, David, Sons Co.
Slashers.
Cohoes Foundry & Machine Co.
Leigh, Evan A.
Lowell Machine Shop.
Riley, C. E. & Co.
Smokestacks.
Allen, Wm. & Sons Co.
Hartford Blower Co.
Soaps.
American Soap & Washoline Co.
India Alkali Works.
O. K. Soap Co.
Rome Soap Mfg. Co.
Tully, J. J.
Spindles.
Bamford & Smith.
Buckley, Benjamin, Sons, Gun Mill.
Draper Company.
Easton-Burnham Co.
Leigh, Evan A.
Riley, C. E. & Co.
Stoddard, Haserick, Richards & Co.
Ward & Vandegrift.
Whitin Machine Works.
Spindle Tubes.
Bamford & Smith.
Riley, C. E. & Co.
Stoddard, Haserick, Richards & Co.
Spinning Cylinders.
N. E. Ventilating & Heating Co.
Spinning Frames.
——See Cotton Machinery.
Spinning Rings.
Draper Company.
Whitinsville Spinning Ring Co.
Spinning Tubes.
Buckley, Benjamin, Sons, Gun Mill.
Spools.
——See Bobbins, Spools, Shuttles, Etc.
Spoolers.
Easton & Burnham Machine Co.
Lindsay, Hyde & Co.
Payne, George W. & Co.
Stamps for Hosiery.
Atlas Copper Stamp Works.
Wells, Wilfred.
Steam Boilers.
Allen, Wm. & Sons Co.
Steam Boiler Insurance.
Hartford Steam Boiler Inspection & Insurance Co.
Steam Boxes.
Allen, Wm. & Sons Co.
Steam Engines.
Allis-Chalmers Co.
American Blower Co.
Arlington Mch. Wks. (Arthur Birch, prop.)
Atlas Engine Works.
Birch Bros. Co. (Somerville Mchn. Works).
Buffalo Forge Co
Fishkill Landing Machine Co.
Harrisburg Foundry & Machine Co.
Hooven (The), Owens & Rentschler Co.
Sturtevant, B. F. & Co.
Textile Finishing Machinery Co.
Steam Jacket Kettles.
Badger, E. B. & Sons Co.
Steam Pumps.
Goulds Manufacturing Co., The.
Steam Specialties.
Butterworth, H. W., Sons Co.
Crosby Steam Gage and Valve Co.
Lunkenheimer Co.
Mason Regulator Co.
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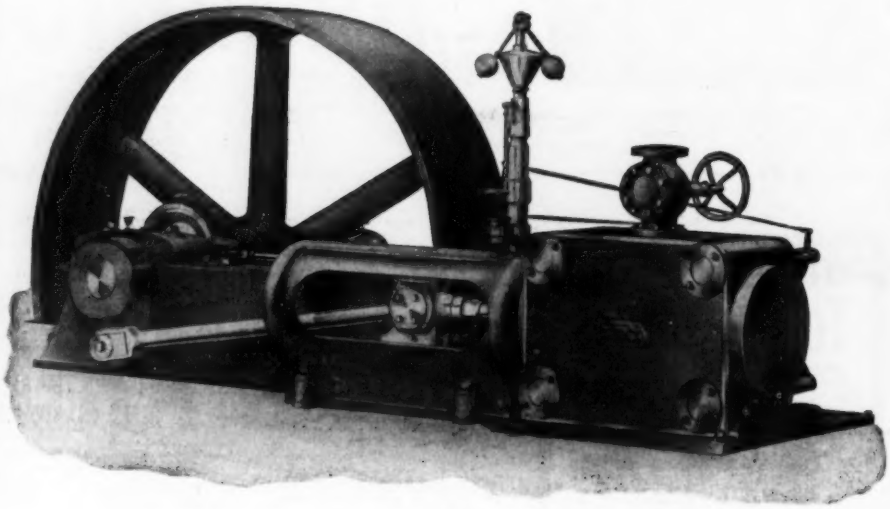

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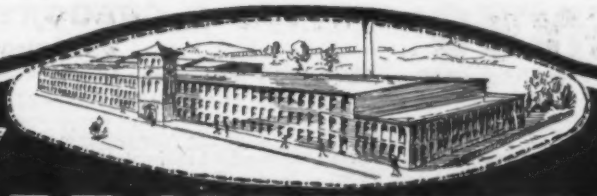

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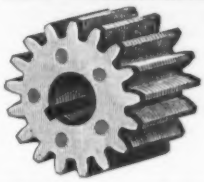

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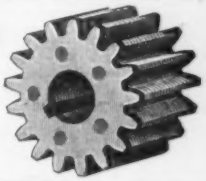

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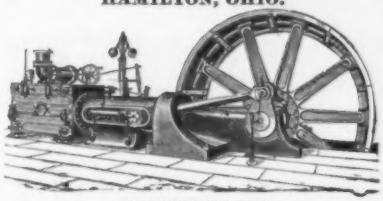

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COTTON CARDERS.

Carder in Cotton Mill. Coarse or fine, white or colored, hosiery, Egyptian, etc. Age 35; Canadian; married. 3029, Textile World Record.

Overseer of Carding. Large experience on all kinds of work and both English and American systems. Can furnish first-class references. Had charge of carding in some of the best New England mills. 3009, Textile World Record.

Overseer of Carding. Age 39; married. Worked on coarse and fine numbers and combers. American and English machinery. 3012, Textile World Record.

Overseer of Carding or cotton ring spinning. Worked on carded and combed Peelers, Egyptian, and Sea Island cottons, making yarns from 8 to 80. 3015, Textile World Record.

Overseer Cotton Carding or Spinning desires position. Age 47; American; married. Is familiar with all the modern makes of English and American machinery, revolving top flat cards, single and double carding. 2073, Textile World Record.

Overseer of Carding. Has held all positions in picker and card rooms. White and colored goods, 5s to 40s. 3070, Textile World Record.

Overseer of Carding Mill. All kinds of fine yarns. Started up two of the largest card rooms in New England. Considered an expert in the manufacture of combed yarns from the bale to the finished article. First-class recommendations. 1745, Textile World Rcord.

Overseer of Cotton Carding. Worked on all classes of cotton, carded and combed, in counts to 135s. Will not go West or South. 3061, Textile World Record.

Carder and Spinner, also twister, spooler and winder. Will go anywhere, but prefers New York state. Age 30; American. Shoddies and cotton mixes, camel hair, noils from 1 to 7 run for weaving or knitting. 2082, Textile World Record.

Overseer of Carding or Ring Spinning. Age 35; American. Sheetings, prin s and yarns, coarse and fine. Worked on most American machinery, but is more familiar with Lowell & Whitin. 1915, Textile World Record.

WOOLEN CARDERS.

Overseer of Woolen Carding, age 32; American; married. Good experience and excellent references. Worked in kerseys, meltons, cheviots, cassimeres, coverts, dress goods, broadcloths, etc. 2060, Textile World Record.

Overseer for Washing, Carding or Combing wool for worsted wants to better himself. Speaks German, French and English. Best of references. 2093, Textile World Record.

Carder, or carder and spinner. Age 49; American. Has worked on all kinds of woolens, and of late on shoddy and cotton mixes. Is familiar with Davis & Furber machines. Excellent reference from past employer. 1944, Textile World Record.

Overseer of Woolen Carding. Worked on all wool, wool and shoddy, wool, shoddy and noils. Wants $4 a day. Familiar with Davis & Furber, Furbush, Lombard and Bollette and Brown Patent. 3071, Textile World Record.

Overseer of Carding and Spinning. Middle aged; English; married. Dress goods, flannels, blankets, overcoatings and plush goods. English and American makes of machinery, also an expert on the Bollette condenser. 2079, Textile World Record.

COTTON WEAVERS.

Overseer of Weaving or designer. Lawns, sheetings, twills, sateens, quilts, bedford cords, lappets. A young man; unmarried. Good experience and first-class recomendation. 3063, Textile World Record.

Overseer of Weaving. Englishman; 33 years of age; married. Worked on fine lawns, sheetings, sateens and fancies, coarse drills, twills, bicycle cloth, automobile cloth for tires. Familiar with Whitin, Crompton, Knowles, Mason, Kilburn & Lincoln and Lowell machines. 3073, Textile World Record.

Overseer of Weaving. Accustomed to fancies. Can do own designing and figuring. Good references from past employers. Is open to go anywhere. Had experience on many kinds of looms, including the Draper. 1731, Textile World Record.

Overseer of Weaving in cotton mill. Worked on lawns, dimities, sheetings, corduroys, velveteens, etc. Colvin, Mason, Whitin, Kilburn & Lincoln, Knowles and Draper looms. 3011, Textile World Record.

Overseer of Weaving or assistant superintendent. Age 33; English; married. Worked on prints, sheetings, colored goods, etc. Prefers New England. Good experience, and first-class references. 3041, Textile World Record.

Overseer of Weaving. Age 35; Scotch; married. Good experience, and excellent references, Crompton, Whitin, Lowell, Colvin, Woonsocket and English looms. Sheetings, lawns, ginghams, flannels, fine worsteds, dress goods, shirtings and novelty goods. 2016, Textile World Record.

WOOLEN WEAVERS.

Overseer of Weaving, also designer. Men's wear, woolen and worsted, and fancies of all kinds, cotton worsteds, dress goods. Knowles and Crompton looms. Age 35. 3056, Textile World Record.

Overseer of Weaving, or would take good second hand job. Age 42; married. Worked on dress goods, suitings, plaid backs, cloakings, meltons and other classes of goods. Worked on Crompton & Knowles loom. 3016, Textile World Record.

Woolen Boss Weaver. Steady, reliable and an excellent man in a weave room. Has worked on almost all kinds of woolen goods, and is familiar with Crompton & Knowles looms. Will accept position for not less than $2.50 per day. 2088, Textile World Record.

Boss Weaver or assistant designer. Wants position with a firm who is willing to advance a man as he proves himself worthy. 28 years old; married, and a steady worker. For past six years worked in all parts of the weave room and pattern room, pattern weaving and dressing, chain building, harness raising, perching, fixing and regular weaving. Now taking course of study in woolen and worsted designing. Excellent reference. 2019, Textile World Record.

Boss Weaver or assistant superintendent. Worked on all kinds of worsteds and woolens. Crompton & Knowles looms. Wants place at once. Middle aged; English; married. Good experience. Excellent references. 3062, Textile World Record.

Boss Weaver. Aged 38; married. Cassimeres, beavers, kerseys, dress goods, flannels, blankets. Worked on Crompton & Knowles broad looms. Good recommendation. 3066, Textile World Record.

COTTON SPINNERS.

Overseer of Mule Spinning who has had a wide experience in large New England mills on yarns ranging from 24's to 160's is open to a position. 37 years old; American. Good references. 2003, Textile World Record.

Cotton Mule Spinner. Age 42; French; married. Has worked on prints and sheetings and on yarns from 9's to 50's. First class references. Two years' experience as secondhand and five as overseer. Wants $2.50 per day to start with. 1690, Textile World Record.

Secondhand Spinner. Held positions of charge of cone and tube winding and spooling, also section of spinning frames. Cotton yarns 8's to 100's on twisters, spoolers, winders, warpers. 3030, Textile World Record.

Overseer of ring spinning, spooling, warping and dressing. Will not go South. Middle aged; American; married. Good experience and references. 3059, Textile World Record.

Boss Ring or Mule Spinner. Age 43; English; married. Asa Lee mules, Lowell Machine Shop, Platt, Mason mules; Howard & Bullough, Lowell and Mason frames. Yarns from 5's to 90's. 3001, Textile World Record.

Overseer of Cotton Mule Spinning. Understands Mason and English makes of mules. Has worked in mule room sixteen years, five years as second hand and a year and a half as overseer. 28 years old; married; steady and temperate. Would like to get work in N. E. or New York states. Has worked on colored hosiery yarn and filling. 1822, Textile World Record.

Overseer of Ring Spinning. Aged 42; American; married. Ginghams, sheetings, awnings, denims, etc.; $3 to $4 per day. 3018, Textile World Record.

Overseer Ring Spinning, Warping and Spooling. Is experienced on white work from Nos. 4's to 30's. Is familiar with Whitin and Lowell Machine Shop spinning frames and spoolers and warpers. Wants $3 per day to start with. Age 39; American; married. 1703. Textile World Record.

WOOLEN SPINNERS.

Overseer of woolen spinning desires to make a change. Is familiar with suiting, union, cassimere, satinet and knitting yarns and all ordinary makes of machinery. 30 years of age; American; married. Good references as to character and ability. 1987, Textile World Record.

Overseer Woolen Spinning. Is thoroughly competent to take charge of a large spinning room. 38 years old; French; married. Has spun yarns for flannels, tweeds and knit goods, also cotton and wool mixes, shoddies, ranging in all from 1/2 to 14 runs. Is familiar with Davis & Furber, Johnson & Bassett, Platt and other makes. Very satisfactory references. 1917, Textile World Record.

Worsted Spinner or Section Hand. Age 22 and unmarried. At present employed, but not satisfied with surroundings. Would accept moderate pay. 1709, Textile World Record.

Overseer of Ring or Frame Spinning, or would take superintendent position. Age 41; married. 2040, Textile World Record.

Boss Spinner. Age 34; Scotch. Worked on all wool, cotton and wool and shoddy mixes. Will not go West, South or to Canada. References. Good experience. 3032, Textile World Record.

Overseer of Woolen Spinning. Age 44; American; married. Worked on cassimeres, flannels, tweeds and dress goods. Johnson & Bassett and Davis & Furber mules. Will not go West or South. Good experience and first-class recommendation. 3049, Textile World Record.

DYERS.

Boss Dyer and Bleacher. Age 34; English; married. Yarns, warps, knit goods. Can give good references. Wants $4 or more. 3020, Textile World Record.

Dyer or chemist. A young man 26 years old; single. Cassimeres, dress goods, overcoatings, cloakings, etc. 3057, Textile World Record.

Superintendent or assistant of dye or bleach works. Age 35; English; married. Will not go to Canada. 3053, Textile World Record.

Boss Dyer. German. Fifteen years' practical experience. Would like to go West or South. Worked on yarn, piece goods, raw stock, knit goods and hosiery. Can furnish references. 3045, Textile World Record.

Dyer. Age 33; Scotch; unmarried. Worked on every kind of woolen cloth, serges, meltons, shoddy worsted and woolen yarn, etc. Wants $5.50 per day. Will not go South. 3064, Textile World Record.

Dyer, Scourer and Bleacher in knitting mill. Age 39; married. All grades of underwear, spring and latch needles. First-class recommendations. Will not go West or to Canada. 3004, Textile World Record.

Dyer on cotton and woolen piece goods, yarn and fast black on cotton. Age 42; married. 3021, Textile World Record.

Boss Dyer. A young man; unmarried. Worked on knit goods, raw stock, dyeing wool and cotton. Refers to past employers. 3069, Textile World Record.

Cotton Dyer, bleacher or chemist. Age 39. Drills, ducks, sateens, brocades, cotton trowserings, cambric handkerchiefs, sheetings, etc., also printing. Large experience on all classes of cotton goods. 1966, Textile World Record.

Overseer of Dyeing and Finishing. Has worked on all kinds of piece dyeing, both cotton and wool, and all kinds of raw stock, dress goods, blankets and fancy cassimeres. Is familiar with Curtis & Marble, Parks & Woolson and Hunter fulling mills. Good references. 2064, Textile World Record.

Dyer. Raw stock, chain, warp and skein work. Would like a position in North Carolina, but will go anywhere. Married; American. Good references. Address 973, Textile World Record.

Dyer and Bleacher. Fast colors on cotton, also common colors, one dip warp and skein. Age 38. Married. Excellent references. 1954, Textile World Record.

Boss Dyer. Cotton warps, skein and raw stock used in cottonades, domets, flannelettes, gingham, shirtings and indigo blue denim. Good experience. Age 38. Scotch. Married. 850, Textile World Record.

Boss Dyer. Has a practical knowledge of the combination of colors and shades and has matched to shade. Steady, sober and industrious. Underwear, piece dyes and raw stock, mercerized goods, wool and cotton. 1513, Textile World Record.

Cotton Dyer, bleacher or chemist. Age 30. Drills, ducks, sateens, brocades, cotton trowserings, cambric handkerchiefs, sheetings, etc., also printing. Large experience on all classes of cotton goods. 1966, Textile World Record.

Dyer. A young man, age 22, single, American, and now employed as a second hand in a cotton mill, would take a position as dyer in a small mill or second hand in a large mill. Has had experience in the dyeing and bleaching of cotton yarn and piece goods. 1948, Textile World Record.

FINISHERS.

Finisher of Cotton Goods, also worsteds, by calender, hot press and beetle, also understands frames, starching and mercerizing. Age 25; English. 3006, Textile World Record.

Finisher, both wet and dry. Age 28; English; married. Shirtings, ginghams, cotton dress goods, mercerized effects and men's cotton suitings and trouserings. Excellent references. 3007, Textile World Record.

Cotton Finisher. Age 27. Worked on prints, lawns, dimities, muslins, ducks, drills, Madras, etc. Understands folding and packing. 3005, Textile World Record.

Overseer of Finishing, worsted goods, white or fancy. A young man; married; English. Has had full charge of piece dye finishing. 3019, Textile World Record.

Overseer of Finishing. Prefers a satinet mill. Eight years' experience as overseer. Aged 47. 3017, Textile World Record.

Boss Finisher. Worked on broad cloth, cheviots, kerseys, coverts, meltons, piece dyes, dress goods. Prefers Massachusetts, but will go anywhere in New England. Not employed and wants place at once. Young man; American. 3046, Textile World Record.

Overseer of Finishing. Age 30; American; married. Woolens, worsteds and cotton mixes. Prefers worsted mill. 2080, Textile World Record.

Boss Finisher. Would take good secondhand or wet finishing job. Age 41; English. All kinds of woolen and worsted goods, both steam and dry finish. Willing to go anywhere. Both English and American makes of machinery. Excellent references. 2061, Textile World Record.

Overseer of Finishing. Age 32; American. Woolen and worsteds, suitings, coatings, cloakings, cassimeres, cheviots, meltons, frieze, etc. 2070, Textile World Record.

Boss Woolen Finisher. English; married. Indigo blues, broadcloths, doeskins, meltons, cheviots, coverts, overcoatings and fancy cassimeres. Good experience and excellent references. 1613, Textile World Record.

Woolen Finisher. First-class. Familiar with all classes of goods and machinery. Can take full charge from loom to case. Has always been very successful. 1244, Textile World Record.

Boss Finisher of underwear, cotton or wool mixed goods, who understands Wheeler & Wilson buttonhole machines, Union Button, Union Special, etc., is open to a position in the New England or Middle States. 30 years; American; married. Been employed for a number of years by concern for whom he is now working. Exceptionally good references. 1958, Textile World Record.

Foreman of Finishing room, folding, packing, etc. Age 49; married; American. Has had over 12 years' experience as foreman on white goods in one of the largest bleacheries in the country. First-class manager of help and capable of getting good results. 1870, Textile World Record.

A Good Second-hand Finisher who thoroughly understands Union cassimeres, meltons and satinets, would like a position. 30 years of age, American, married. Well up on all well-known makes of machinery, and capable of taking a boss job. Good references. Reasonable wages expected. 1970, Textile World Record.

Overseer Finishing from loom to case. Fine worsteds, cotton worsteds, cheviots, cassimeres, meltons, cotton and shoddy mixed. All kinds of face finished goods and piece dyes. Will not go West. Age 44. Married. American. Good experience. 1748, Textile World Record.

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KNITTERS.

Foreman of Knitting Room, spring needle or flat knitting. Age 28. Fleeces of all kinds and gauges, balbriggan from 20 to 30 gauge, flat wool work all gauges. Is familiar with Tompkins Bros., Campbell & Clute and Crane machines. 2062, Textile World Record.

Knitter. Worked on light and heavy weight ladies' ribbed vests and shaped vests, and all kinds of common knit goods. Familiar with Champion, Nye & Tredick, Star, McMichael & Wildman machines. Wants work in Pennsylvania or Western States. 3037, Textile World Record.

Boss Knitter. finisher or machinist. Worked on nearly all kinds of knit goods, and nearly all kinds of latch needle knitting machines and all kinds of machines used in finishing underwear. 889, Textile World Record.

Overseer Boarding and finishing hosiery. All kinds of men's, women's and children's hosiery, except silk. Age 41; American; married. Can furnish references. 3035, Textile World Record.

Asst. Superintendent or Boss Knitter. Age 29, strictly temperate and held position of boss knitter for past four years running. Fleeces, balbriggan and flat work on spring needles, and plaited, straight and shaped work on several makes of latch needles. Can give best of references. 1492, Textile World Record

Overseer on Spring Needle circular knitting machines wants position. An ingenious, energetic and progressive man, who has spent his life in one of the largest and best equipped knitting mills in country. Particularly good on fine jerseys, stockinets, fleeces, eiderdowns, rubber linings, dress shields, blankets, slipper cloth, etc. 2094, Textile World Record.

Machinist on Leighton circular machines. Worked on sweaters and jacket. 2026, Textile World Record.

DESIGNERS.

Designer in small mill or assistant in large mill. Age 22; Scotch; single. Has worked on fancy cassimeres, plaid backs, coverts, unions, worsted trouserings and shirtings. Fair knowledge of Jacquard designing. Johnson & Bassett mules, Davis & Furber dresser, and Knowles looms. Is willing to work for moderate salary, with chance of promotion. 1837, Textile World Record.

Smart Designer, high class worsteds and coatings and trouserings. Thorough experience leading factory. Now abroad; anxious to find employment in this country. Moderate start. 1816, Textile World Record.

Assistant Designer on woolen or worsted dress goods and suitings is open to a position. Age 21; American; single. A graduate of one of the largest textile schools in the country, and has had experience in a good New England mill. Also understands flannels and satinets. Good references. 1923, Textile World Record.

Designer or Assistant Superintendent desires a position. 27 years old; Scotch; married. Familiar with all well known makes of machinery and with woolen, worsted and cotton goods. Good references. Will go to any part of the United States. Terms reasonable. 1996, Textile World Record.

A Young Man, 23 years of age, English, would like a position as assistant designer or boss weaver. Has worked on woolen dress goods, cloakings, suitings and worsted suitings. Good references. Moderate wages. Three weavers in family. 1997, Textile World Record.

Designer or Assistant Designer. Woolens and Worsteds. Five years' experience in the Pattern Room as weaver and foreman. Conversant with all the details, practical and technical. First-class references. English; married; age 28. 3031, Textile World Record.

Designer, or assistant designer. Unions, flannels, tweeds, beavers, serges and worsteds. Age 28; English; married. Can furnish first-class references. 3031, Textile World Record.

Designer. Plain satin, fancy leno, checks, colored and dainties in cotton. Wants $3.50 or over a day. 3043, Textile World Record.

Designer, or assistant superintendent and designer. An A1 color designer. Can get up good line of fancy woolen and worsted goods which will be good sellers and profitable to the manufacturer. Graduate of a prominent designing and textile school in Germany. Is well posted on all kinds of stock, cotton and shoddy, and with the general work of a woolen mill. 1789, Textile World Record.

Designer, or assistant superintendent. Has attended the textile school in Germany. Good experience in every part of business, in dress goods and men's cloth. Has worked in the finishing and dyeing room. Full experience in all kinds of Jacquard designing. 2085, Textile World Record.

A Young Man, 23 years of age, competent to handle the designing for a cotton or silk mill, would like a position. Has made in cotton, plain, fancy and leno; in silk, tie silks, dress goods and linings. Looms, all well-known makes. Is Scotch, and single. 14 years' experience in weave room and designing room. Good references from N. J. and Conn. mills. Four workers in family—weavers. 1897, Textile World Record.

A First-Class Designer or superintendent desires position. Understands vestings, dress goods, silk labels, shoe facings, shoe straps, shirt labels and tapes of all descriptions. Large experience on Jacquard work. Age 26; single; English. Strictly temperate. 1773, Textile World Record.

MISCELLANEOUS.

Loom Fixer. Age 27. Knowles and Crompton looms. Wants not less than $2.25 per day. Will not go West or to Southern States. 3014, Textile World Record.

Salesman for hosiery and underwear. Age 37, single. Can furnish references. 3060, Textile World Record.

Master Mechanic, or mechanical superintendent. Many years' experience in general machine work and mill engineering. References. 3067, Textile World Record.

Fixer of sewing machines. Is familiar with machinery of all kinds that is used in making up and finishing knit underwear. Will not go West or South. Wants place at once. References. 3068, Textile World Record.

Master Mechanic in cotton mill. Wants $1,500 to $2,500 per year, according to duties and position. Can take place at once. Will not go to Western States or Canada. Familiar with steam engines, pumps, boilers, water wheels and complete cotton mill equipment. 3039, Textile World Record.

Second Hand in cloth room desires position. At present has charge of samples in large mill. Has worked on all classes of cotton goods. Strictly temperate. 3048, Textile World Record.

Overseer of Warping, Spooling and Winding. Dress goods and cloth. Will not go to Canada. Aged 40; married. Good experience. References. 3027, Textile World Record.

Asst. Superintendent. Young man, 26, graduate of Lowell Textile School (Woolen and Worsted Course). Has had considerable experience in setting up machinery, and worked in nearly every department of mill. Wants position in which there is a good chance to advance. 3040, Textile World Record.

Master Mechanic wishes position in the North. 35 years old; married. Worked 15 years on repairs. Wants $3.50 per day. Has license for running engines and boilers Understands all kinds of water wheels and care of same, dynamos and electric lights and also gas houses, and a good knowledge of building, all kinds of wood work and piping and blacksmithing. Understands cotton mill repairs as good as the best man at such work. 2025, Textile World Record.

An Expert on soap making and wool scouring will be open to a position shortly. Is familiar with the treatment of all grades. About 40 years old; English; married. Has worked for one concern in the United States for 12 years. 1980, Textile World Record.

Paymaster or Bookkeeper. Agent or Manager wood or iron working plant or small cotton mill. 28 years' experience. Expert accountant. Can take charge of all the office work in large factory or do all myself in small factory. Good references. Will go anywhere in New England or Middle States. 1881, Textile World Record.

Overseer Colored Cloth Room. Age 48; American. 25 years' experience as secondhand. 1765, Textile World Record.

A Second-class Engineer, 48 years of age, American, would like a position as such in a N. E. mill. Is steady and reliable. Good references from former employers. 1965, Textile World Record.

A Young Man who thoroughly understands the keeping of mill books would like a position in the Southern States or would go to Cuba or Puerto Rico. Is a first-class man and perfectly familiar with general office work. An American; 22 years of age; single. Steady and reliable, and can give good references. 1914, Textile World Record.

Roll Coverer wants an opening for work. Can cover cotton or worsted rolls, make aprons, or better, has had large experience. Can furnish tools. Work by piece or day. 1803, Textile World Record.

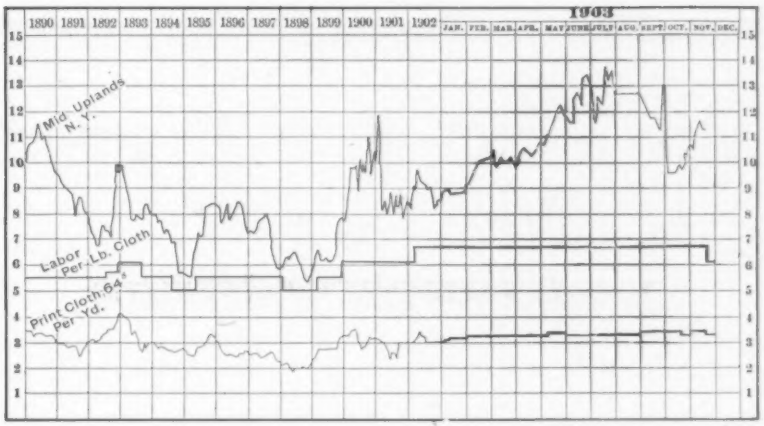
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CHART SHOWING RANGE IN THE PRICE OF COTTON TO DATE.

The Cotton Market.

Cotton has advanced sharply since last month and the increase has been well maintained. A feature of the situation has been the liberal movement of cotton and at this writing the visible supply is slightly larger than a year ago. The Chronicle estimates the world's visible supply, Nov. 21, at 3,210,032 bales, as compared with 3,203,482 bales at the same date in 1902, 3,343,287 bales in 1901 and 3,271,280 bales in 1900.

The heavy shipments for export indicate that foreign spinners are replenishing their depleted stocks. The conditions approaching a cotton famine last July and August have taught a lesson to cotton manufacturers. They are naturally cotton bears, but first of all they are business men and recognize that conditions must be met as they exist and that nothing they can do can change the apparently undeniable fact that the demand for cotton is overtaking the supply. This explains the general desire to fill the mill storehouses as soon as possible from the new crop, and to avoid being caught next July and August with no cotton at the mill and only a very poor selection of high priced cotton in the market.

One of the difficulties in the recent corner in cotton was the scarcity of grades that the spinners needed. The advance in the market value was even greater than the quotations indicated because of the inferiority of the cotton offered for sale.

Interesting to Bleachers.

A most attractive sample card has just been prepared by Messrs. Bosson & Lane of Atlantic, Mass., being a practical demonstration of the merits of their B. & L. Anti-Chlorine for bleaching. Samples of material treated with B. & L. Anti-Chlorine are shown, and much general information bearing on the subject of bleaching and the peculiar merits of this material. The card is convenient for manufacturers' and dyers' files, and we understand will be sent to interested parties on application.

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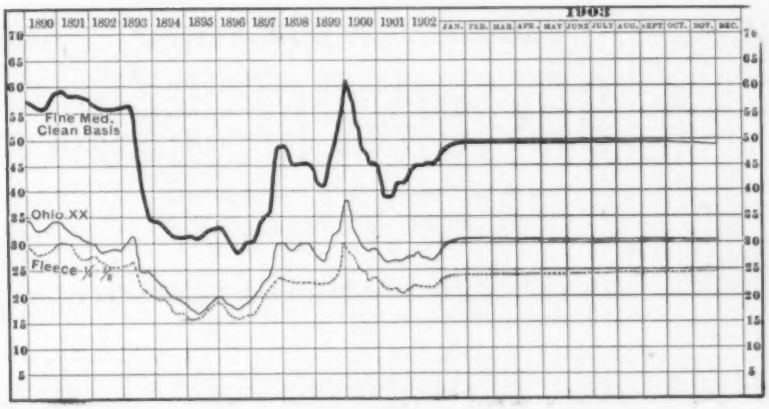


CHART SHOWING RANGES IN THE PRICE OF WOOL TO DATE.

The Wool Market.

This market has been quiet and without change since our last report. Manufacturers have bought only for immediate requirements. This reluctance to buy wool at prevailing quotations has been ascribed to the desire to have the stock of raw material as low as possible when the approaching inventories are taken. This is doubtless true to a certain extent, but the principal reason why manufacturers are not buying wool is that they do not need it now and see no prospect of an increase in their requirements in the immediate future.

The business on light weights has been disappointing to most manufacturers and the general opinion among them is that they will be able to buy wool at lower prices than at present in case an increased demand for goods develops. The idea of any material advance in wool is not entertained, and while waiting for the heavy weight season to open they are content to let the wool dealers carry the wool and pay interest on the investment. This load on the wool dealers is by no means a light one and predictions are freely made that it will soon become so heavy as to force a general unloading at the best prices obtainable. The Eastern wool dealers took the last clip from the west at high prices and as they are not in business for their health the wool is held firmly for an advance on the cost. It speaks well for the financial strength of the wool trade that no break in prices has occurred, but unless there is a material improvement in the demand the strain will become too great for the weaker part of the trade at least. The approach of annual inventories, the uncertainty of the political situation, the decreased demand for goods and the unmistakable decline in the volume of general business, lead woolen manufacturers to reef their sails and get ready for any squall that may come up. There has been a good demand for sample lots and these may result in large sales if the developments of the near future are favorable.

THEODORE JUSTICE. HENRY JUSTICE.

JUSTICE, BATEMAN & CO.

Wool Commission Merchants,

122 South Front St., PHILADELPHIA.

STANDARD QUALITY COMBED RAMIE TOPS and NOILS a Specialty. RAMIE YARNS In All Numbers for All Purposes

SOLE AGENT,

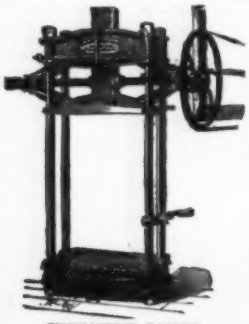
Frank A. Tierney,

WOOL, TOPS, NOILS, YARNS,

Fine, Medium and Coarse Wool Tops. Mohair Tops. Camel Hair Tops. Fine, Medium and Coarse Wool Noils. Mohair Noils. Camel Hair Noils. Silk Noils.

Special Fibres and Novelties for Woolen, Cotton and Silk Manufacturers.

Room 203, Wool Exchange Building, 260 W. Broadway, NEW YORK.



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Any Size .. Any Power

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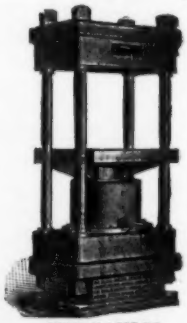

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ALL KINDS OF Spindles

USED IN THE MANUFACTURE OF COTTON, WOOL & SILK

IMPROVED UPRIGHT SPOOLERS
TO SPOOL FROM COP, SKEIN, OR BOBBIN.

The COHOES SLASHER.

BELT-DRIVEN, ELECTRIC and HAND-POWER ELEVATORS
For Cotton Mills, Warehouses and Factories.

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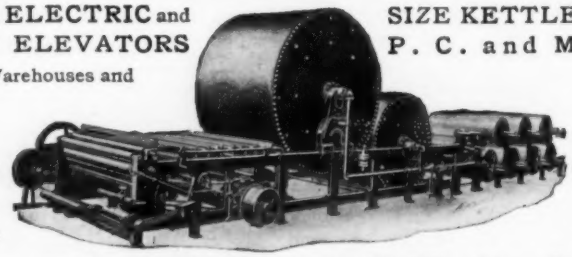

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WATERWHEEL GOVERNORS.

The COHOES IRON FOUNDRY & MACHINE CO, Cohoes, N. Y.

A Crosby Indicator

In the Hands of a Competent Man Will Increase the Efficiency of Your Plant and Cut Down Your Coal Bill. Faultless in Design. Perfect in Workmanship.

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Single Bell Chime Whistles
Feed Water Regulators
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CROSBY STEAM GAGE AND VALVE CO.

Stores:
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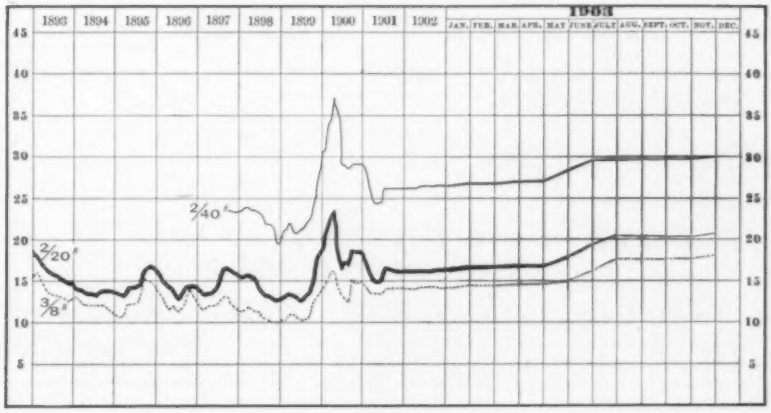
Office and Works:
BOSTON, MASS.

Yarn Department.



GRAPHIC CHART SHOWING RANGE OF PRICE OF COTTON YARN TO DATE.

The Cotton Yarn Market.

Spot business in cotton yarn has improved since our last report and the situation has been strengthened not only by an increased demand, but also by depleted stocks of required sizes and qualities. In addition to these two factors the rise in the price of raw cotton has still further strengthened the market.

Buyers in many instances have failed to secure the yarn required and have been forced either to take undesirable substitutes or wait for the yarn to be spun. The conditions indicate an unmistakably healthy balance of supply and demand in the yarn trade and one that will prove to the advantage of both spinner and buyer of the goods.

While spot business is active there is a decided unwillingness shown by buyers to make contracts for the future. The trade has not yet become wholly reconciled to 11 cent cotton. To many that figure seems a dizzy height for a commodity that went begging at 6 cents a few years ago, and they hesitate to make contracts for yarn on a basis that they view as abnormally high. Conditions have changed materially in the statistical position of both raw cotton and yarn since the former was sold at 6 cents. There is no question that the stock of yarn throughout the world is low, very low. The idle mills on both sides of the Atlantic demonstrate this fact, and demonstrate that the present price level for raw cotton is based on a statistical and not a speculative condition. We quote on yarn as follows:

Eastern Cops.

6's	18¾
8's	19¼
10's	19¾
14's	20¾
16's	21½
22's	23
24's	23½
26's	24
30's	25
34's	26
36's	27
40's	28

On cones, ¾c. more up to 14's; 1c. more from 15's to 22's; 1½ c. from 23's to 35', and 2c. above that.

Eastern Two-Ply Skeins, Carded Peeler.

12's	21
14's	21½
18's	22½
20's	23½
22's	24
26's	25
28's	26
30's	27
36's	28
40's	30
45's	33
50's	35
55's	39
60's	46

Eastern Two-Ply Warps, Carded Peeler.

2/30's	27-28
2/36's	29-30
2/40's	30-31
2/45's	33-34
2/50's	35-36
2/60's	46-47

THE J. R. MONTGOMERY CO.,

Windsor Locks, Conn.

MANUFACTURERS OF

Mercerized Cotton Yarns Gives the High Silk-Like Lustre in Knit Goods and Woven Fabrics.

Novelty Yarns Boucle, Bourette and Spirals, in Cotton, Wool, Worsted, Mohair and Silk.

Cotton Warps on Beams, Jack Spools and Tubes. In Fancy, Twist, Colors and Printed.

GREENE & DANIELS MFG. CO.,

COMBED, CARDED AND GASSED

Yarns, Threads, Twines and Chain Warps,

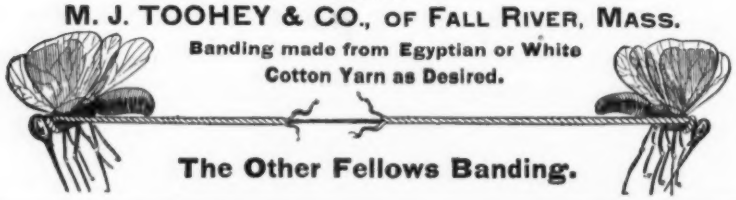
Colored and Bleached Yarns Furnished in any manner desired by the trade.

Pawtucket, R. I.

THESE MULES CANNOT BREAK THE **BANDING** —MADE BY—

M. J. TOOHEY & CO., OF FALL RIVER, MASS.

Banding made from Egyptian or White Cotton Yarn as Desired.



The Other Fellows Banding.

MONUMENT MILLS,

Manufacturers of

White, Colored, Fancy and Double Twist

COTTON WARPS

HOUSATONIC, MASS.

4s to 60s.

Dana Warp Mills

WESTBROOK, ... MAINE

White and Colored Warps 6s to 50s Single and Ply

Mule Cops From 30s to 50s from American & Egyptian Cotton

Egyptian Weaving Yarns.
Single Skeins Combed.

30's	38
35's	40
40's	42
45's	43½
50's	45½
55's	51
60's	55½
70's	59½

Two and Three Ply Skeins, Combed.

30's	39
36's	42
40's	44
45's	50
50's	53½
55's	55
60's	59½
70's	67

Philadelphia Market.

The yarn market has been very firm the past month, and prices have followed the advance in cotton. The demand for all kinds of yarn has been exceptionally good. This may have been induced partly by speculative orders. Buyers have displayed a good deal of anxiety to cover and spinners have taken advantage of the demand to raise prices.

Prices are at about the level attained last summer, during the cotton corner. Weaving yarns have been selling on a slightly better basis of price than knitting yarn. The advance, however, has been general in all lines,—carded and combed, peeler and Egyptian yarns.

Spinners are well sold ahead, which ought to indicate a stability to present prices. The advance in cotton has helped manufacturers to secure an advance on their goods, and it is gratifying to know that jobbers are having to pay a reasonable advance for goods. The Brussels carpet trade have been successful in advancing prices, and it is an indication of good business that they were able to obtain their advance. We quote as follows:

Southern frame cones (good quality):—

7's and coarser	18½
8's and 9's	18½-18¾
10's	19-19½
12's	19½-20
14's	20-20½
16's	20½
18's	21
20's	21½-22
22's	22-22½
24's	22½-23
26's	23½
30's	24
40's	29
50's	36

BUCKINGHAM, PAULSON & CO.
Commission Merchants
COTTON YARNS of all Descriptions
83 LEONARD STREET, .·. NEW YORK
302 Chestnut St., Phila. 210 Munroe St., Chicago, Ill.
Cash Advances, Cash Sales and Prompt Returns. Consignments and correspondence solicited.

JAMES E. MITCHELL & CO., COMMISSION MERCHANTS.
Cotton Yarns
FOR ALL PURPOSES.
122-124 Chestnut Street, PHILADELPHIA, PA.
Brown Building, 185 Summer Street, BOSTON, MASS.

CATLIN & CO.,
Yarns.
67 CHAUNCY STREET, BOSTON.
216 CHURCH STREET, NEW YORK.
206 CHESTNUT STREET, PHILADELPHIA.

Ballou Yarn Co.
PROVIDENCE, R. I.
Harness and Seine Twines and other Job Gassing, Winding, etc. All Numbers.
GASSED .·. YARN .·. SPECIALTIES

A. D. SALKELD & BRO.,
With FRED'K VIETOR & ACHELIS,
YARNS.
66-72 LEONARD STREET, - NEW YORK.

Fred Sternberg & Co.
530 Broadway, - NEW YORK.
MERCERIZED / TURKEY RED / GASSED } COTTON YARNS.
Ramie Yarns for Knitting or Weaving.

J. S. DODDS,
346 Broadway, N. Y. Life Bldg., New York, N. Y.
MERCERIZED YARNS
Two and Three Ply, for all purposes,
In Peeler, Egyptian and Sea Island, gassed and ungassed, natural and dyed. Fast Black for cross dyeing a specialty.

EDDY & STREET,
Cotton, Woolen,
Yarns and Braids
Worsted, Spun Silk.
PROVIDENCE, R. I.

CAPACITY, 50,000 Spindles. **ORSWELL MILLS** FITCHBURG, MASS.

COMBED **COTTON YARNS** CARDED

In Chains and Skeins, on Balls, Beams, Spools—Single or Twisted.

THE MALCOLM MILLS CO.,

MANUFACTURERS OF

FANCY YARNS and POLISHED THREADS.

Offices: 229 Chestnut St., Philadelphia.

Mills: Frankford, Pa.

KROUT & FITE MANUFACTURING CO.,

Manufacturers of

Silk, Cotton and Mercerized Narrow Fabrics

Spool Tapes a Specialty.

Telephone Connection. Office and Mill, Allegheny Ave. and Emerald St., PHILADELPIA.

FIRE HOSE CORDS From long staple cotton—6s to 20s yarn in 2 to 100 ply—16 lbs. without a knot.

COTTON WARPS On beams—single or ply yarns, grey, bleached or colored.

GLAZED YARNS All plys—any color—for braiders, harness and sewing threads.

UNIVERSAL WIND For braider cops—warp yarns—grey or colored—2 inch to 12 inch traverse.

Dyeing facilities are new and best quality work guaranteed. We are prepared to dye yarns for other parties.

WHITTIER MILLS, Chattahoochee, Fulton County, Ga.

Indian Orchard Company.
Cotton Warps and Yarns, In Gray and all Colors, Single or two or more Ply, and Cable Cord.
Novelty Yarns, in Various Patterns, Colors and Twists.
Carded and Colored Cotton, For Mixing with wool, Machined or in Roving.
Indian Orchard, Mass.

Southern high grade mule yarn:—

	Cones.
10's	20-20½
12's	20½-21
14's	21-21½
16's	21½-22
18's	22-22½
20's and 22's	23-23½
24's	24

Southern frame yarn, lower grades:—

6's and 8's	17½-18
10's	18½

Eastern cones (high grade quality):—

10's	21
12's	21½
14's	22
16's	22½
18's	23
20's and 22's	23½-24

Lower grades Eastern yarn:—

6's and 8's	19-19½
10's	19½-20

Rise ¼c. per number to 16's.

Skein yarn (mostly Southern):—

4's to 8's soft	18
10's to 12's	18½-19
14's to 20's	19½-20½
22's	20
14/2	20
16/2	20-20½
20/2	21-21½
30/2	24½ 25
40/2	29-30
16/3 slack	20-20½
12/3 slack	19½-20
8/3 carpet	17½
8/3 slack	18
9/4 slack	18

Warps (mostly Southern):—

20's to 22's	21-21½
26's	22-23
14/2	20-21
16/2	21-21½
20/2	22
24/2	23
30/2	24½-25
40/2	29-30

Mixed colored yarns (mock twist, half colors):—

6's to 10's	20-21
12's to 14's	21½-22
16's to 18's	22½-23

Silver and jaeger, 1½c. over white.

Mock Egyptian, 2c. advance over white.

Egyptian, 4c. to 5c. above best quality white.

Worsted Yarns.

Spinners are trying hard for orders and are making concessions to secure business. The orders are elusive and much machinery is idle. Yarn is offered to the trade at a positive loss to the

TRY OUR
Silkine, also Lisle Silk
FINISH
—FOR—
Hosiery, Knit Goods, Yarn, Fast Black, Harsh Colors, and Fibres.
O. K. SOAP CO., 968 Franklin St., PHILA.

RICHARD A. BLYTHE,
Commission Merchant,
COTTON YARNS OF EVERY DESCRIPTION.
114 Chestnut St., Philadelphia.

LINEN YARN IMPORTER.
HUGHES FAWCETT, 115 Franklin Street, NEW YORK.
Flax, Hemp and Jute Line and Tow Yarns, For Weaving Purposes.
Linen Jacquard Harness Twines, Fine Cotton Harness and Heddle Twines, For Cotton, Silk, Woolen and Carpet Manufacturers.
Correspondence solicited. Samples promptly furnished.

C. MOORE & CO.,
Manufacturers of
TWINES, THREADS AND YARNS,
Jacquard Harness Twines of all kind on hand and made to order.
S.W. Cor. Fifth and Market Sts., Phila.

DEXTER YARN CO.
Cotton Yarns in Cops, Cones and Skeins; on Beams or Spools, Single and Twisted, Cable Cords and Twines.
PAWTUCKET, . . R. I.

Walcott & Campbell Spinning Co.
Fancy Hosiery Yarns
IN ALL COLORS
New York Mills, Oneida Co., New York

ALLEGHENY WORSTED MILLS,

Thomas Wolstenho'me Sons & Co.,
MANFRS. OF
ALL NUMBERS
SINGLE AND TWO-PLY,
On Cop or in Skein, for Weaving and Knitting Purposes, in White, Natural and Fancy Mixes.

Worsted
YARNS
Sell Direct,
Office and Mills, Frankford Ave. and Westmoreland St., Phila, Pa.

POCASSET WORSTED COMPANY,

Worsted Yarns.

OFFICES:
6th Floor, Banigan Building,
PROVIDENCE, R. I.

CRANSTON WORSTED MILLS.

Worsted and Mohair Yarns—White or colors, in skeins, on spools, cones, or shuttle bobbins.

Novelty Yarns—of Mohair and Worsted. We are the only manufacturers in the United States making these yarns from the raw material to finished product and making yarns only.

Genapped Yarns of all kinds. Doup Yarns. Harness Yarns. For Braids, etc.

DYERS OF YARN AND SLUBBING. BRISTOL, R. I.

French System. **B. F. BOYER CO.,** Bradford System.

MANUFACTURERS OF

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Selling Agent for
BRISTOL WORSTED MILLS,
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Worsted Yarns

ALL QUALITIES AND NUMBERS.

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KEYSTONE SPINNING MILLS CO.,

Manufacturers of
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Wool Scouring, Carbonizing, Garnetting,
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YARNS
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ENGLISH-GREENE CO.

Commission Merchants,

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72 Leonard St., New York.
300 Chestnut St., Phila.

Consignments Solicited for Southern Mills. Liberal Advances Made and Sales Cashed Promptly.

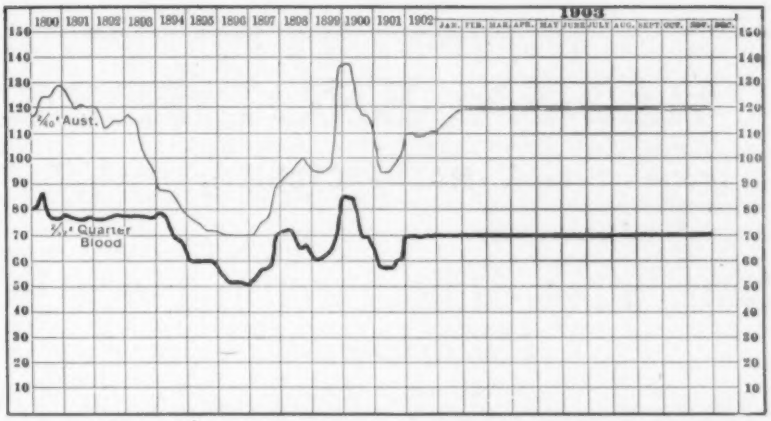

CHART SHOWING RANGES OF PRICE OF WORSTED YARNS.

spinner. There is more or less sampling of novelty yarn. Rain cloth yarn made from 1/24s worsted and 1/80s cotton also 1/35s and 1/110s cotton and 1/24s worsted and 1/100s cotton is being used both in samples and in large quantities for the present year. Some of the spinners have booked quite large orders for this yarn and also the filling to go with it; then there is sampling with one thread black cotton, 1/30s twisted with 1/40s in some color, and there are other sizes in this class of yarn. The dress goods manufacturerers are using more or less novelty yarn in nubs and other specialties. The coming season will call for considerable yarn in 1/2 to 3/8 Blood quality in men's wear in 2/20s to 2/28s, and there will be a good sale provided the price can be made right.

There is a little more buying and the deliveries for the late demands for serges and dress goods have begun.

Whatever may be the condition of the spinner of English spun yarn, the French spinners are getting some good orders from the manufacturers of hosiery. These manufacturers state that they are receiving large duplicate orders and they are surprised themselves because of the condition of other lines of manufacture. Usually these mills run until March on cotton hosiery, and then start in on worsted hosiery, but this year the demand

SILK NOILS AND SILK NOIL YARNS
In White and Colors.
A. T. SKERRY & CO., 47 Leonard Street, NEW YORK.
MOHAIR LOOPS, KNOTS AND FANCY YARNS FOR DRESS GOODS & CLOAKINGS.

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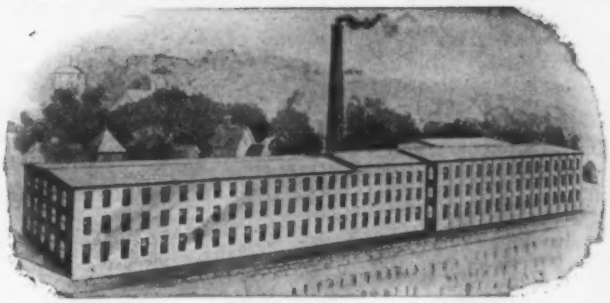
SPINNERS OF MOHAIR YARNS FOR ZIBELINES
DRESS GOODS YARNS
KNITTING YARNS
WORSTED YARNS
MOHAIR

CHENEY BROTHERS,

SILK MANUFACTURERS,

—ALL KINDS OF—

Knitting Silks, Ribbons and Piece Goods

USED FOR TRIMMING KNIT GOODS.

TRAMS, ORGANZINES and SPUN SILKS, IN THE HANK, OR ON CONES, FOR MANUFACTURERS' USE. SILK FOR SPECIAL PURPOSES MADE TO ORDER.

Mills: SOUTH MANCHESTER and HARTFORD, CONN.

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WILLIAM RYLE & CO.,

Foreign and Domestic

Spun Silk Yarns and Noils.

Domestic Thrown Silk of every description. Fine Pure Dye Silks for the woolen trade a specialty. Importers of European and Asiatic Raw Silk.

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WORSTED and WOOLEN YARNS,
MERCERIZED COTTON,
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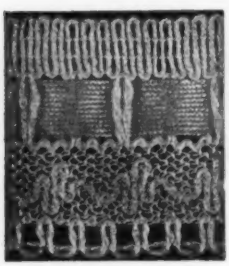
Speed & Stephenson,
WORSTED and WOOLEN
YARNS
A SPECIALTY.
ALSO TOPS.
170 SUMMER ST., BOSTON.
Long Distance Tel. 4168-2 Main.



GEORGE W. CHAPIN,

BRAIDS Cotton, Worsted, Mercerized, Cotton and Silk Twilled. TAPES Common, Twilled, Superfine and plain 18 to 35s, white and colors on spools.

YARNS Cops, Skeins, Warps, Tubes and Cones. THREADS on Spools, Tubes, Cones, Unbleached, Bleached and Colors for Manufacturers' use.

CROCHET LACE EDGINGS. Latest Styles in Pant Laces.

GEORGE W. CHAPIN,

229 Church Street 231 PHILADELPHIA

is so great that they will continue along until March on the worsted goods and they are glad to do it, as they are buying yarn for less money and are getting the same price for their goods.

Spinners of French spun yarn in consequence of this demand and the demand for rain cloth yarn are fairly busy, but there is no "joy" in the spinning business at this time. The wool men are holding prices up on account of the so-called statistical position of worsted wools, and the spinners are lowering prices in order to keep their mills going. When this state of affairs is brought before a wool man he states that the spinner, for the last two years has made money enough and can afford to lose some; that they have them where they want them and the spinner must either pay prices or shut down their plants. On the other hand buyers of yarn are offering 5 to 6 cents per pound below the asking price and, of course, are not getting the orders placed. They do not really expect the prices offered will be accepted, as they do not wish to speculate in yarn as they did one year ago, and consequently will not talk business before January or February. Said one large purchaser of yarn: "We shall buy no yarn until after the first of the year and then we expect to buy cheaper than at the present time." The spinner in this case named a low price, much lower than this price had been when wool was much lower than it is today, and said that he was figuring with two or three concerns for big orders, and that, if he secured any one of them, it would fill his machinery up so that he could take no further orders for that class of yarn; the weaver could not be brought in line, however, and they are all in the same position.

Top makers are maintaining prices for new tops, as they cannot buy wool out of which to make new tops except at a loss. Cloth buyers are keeping out of the market, but this can change at any time.

JENCKES SPINNING CO.,
Formerly E. JENCKES MFG. CO.
Carded and Combed Cotton Yarns for Weavers and Knitters.
Double and Twist Yarns for Woolen Trade.
PAWTUCKET, R. I.

WILLIAM B. CHARLES,
Cotton Yarns,
Cotton Cloth,
Silesia, Sateens,
For the Underwear Trade.
AMSTERDAM, N. Y.

GRANT YARN CO.,
COMBED AND CARDED COTTON.
YARNS 40's and above. AND
FITCHBURG, MASS. WARPS

LUZERNE COTTON YARN CO.,
MERCERIZED YARNS.
Mercerizers, Dyers, Bleachers and Coners,
WILKES-BARRE, PENNA.

American Cotton Yarn Exchange
COMBED and CARDED
COTTON YARNS
From Northern and Southern Mills.
American, Egyptian, Peruvian and Sea Islands.
ARNOLD B. SANFORD, Pres. and Gen. Mgr.
PERCY H. de MAURIAC, Vice President,
OFFICES: 67 Chauncy St., Boston.
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108 Franklin St., N. Y. with James Talcott.

WEIMAR BROS. MANUFACTURERS OF Cotton Mercerized Tapes,
SPOOL TAPES, BINDINGS AND NARROW FABRICS FOR UNDERWEAR AND OTHER TRADES.
Phone Connections. Works, 2046-48 Amber Street, PHILADELPHIA, PA.

Double & Twist and Roving Twists in
Black & White and other combinations,
Randoms, Colors and Mixes.
A. D. SALKELD & BRO.
66-72 LEONARD STREET, NEW YORK CITY.

Woolen and Merino YARNS

Eaton Rapids Woolen Mills,

EATON RAPIDS, MICH.

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WOOLEN YARNS,

Carpet Backing and Rug Yarns a Specialty.

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Main St., foot of Centre St., Manayunk, Phila.

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1 to 10 Runs, at reasonable prices.

All Wool, Mohair and Wool Spun or Mixed Cotton and Shoddy Yarns, in white, gray, and colors.

Dress Goods Yarns a Specialty.

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Knitting and Weaving YARNS.

Cones, Cops, Warps, Skeins,
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Peeler, Egyptian, Mixed Colors.
Large Assortment.

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226 CHESTNUT STREET,

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Carbonized Stock a Specialty. **FLOCKS**

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RIVERDALE WOOLEN CO., MANUFACTURERS OF

.. Shoddies ..

Of every description. Capacity 7,000,000 pounds per annum.
Custom Carbonizing and Garnetting a Speciality.

New York Office.
149 DUANE STREET. RIVERDALE, NORTHBRIDGE, MASS.

We quote:

2/40's Australian	1.20
2/40's XX Delaine	1.10
2/40's Half Blood	1.05
2/20's Half Blood	.85
2/36's ⅜ Blood	.75
2/26's ¼ Blood	.68

Woolen Yarn.

Spinners with established trade continue busy, but not as many orders are in sight at the present time as has been the case during the last two years. The present, of course, is the dull period which will be much changed after the first of the year, as spinners have many sample orders which may or may not result in further business. It is a curious fact that while spinners with a line of trade are busy, if one of the mills for which they are working decides to make its own yarn, it is extremely difficult for the spinner to secure a new customer to take the place of the old one.

The demand at present continues for men's wear cloth, both for warp and filling, and the dress goods manufacturers are buying considerable yarn, both fancy and plain. The mills using yarn for eiderdown cloth are not crowded with business at present. Hosiery manufacturers are taking yarn, both merino and all wool. No new orders are being placed, and the yarn ordered is from contracts placed earlier in the year, at prices which are higher than what the yarn could be sold for at present. The mills in general are buying only for immediate want.

Many weavers of woolen cloth are running much spinning machinery outside their mills. Whether the spinners of woolen yarn are to be as busy next year as they have been in the past is a question. After the first of the year there will be a greater demand for yarn, and contracts will be placed for another year's business. The knitters in New York state are busy in streaks and are placing but few orders outside of import orders for future delivery of thread waste and lamb's wool. Generally the trade is not inclined to place orders until after the first of the year, although none have large stocks of wool or yarn. The knitters that purchased largely before the advance in cotton have all the business they can well handle and are running nights to fill orders, but the mills that were short of raw material are running but poorly and will not get much business until the new season develops.

It is certain that more wool underwear will be made, but none of the knitters will buy ahead even though they are obliged to have stock forwarded them by express. They all talk that they will wait until the trade develops after the first of the year, as they do not wish to carry stock into the inventory, but that after then they will be open to place orders.

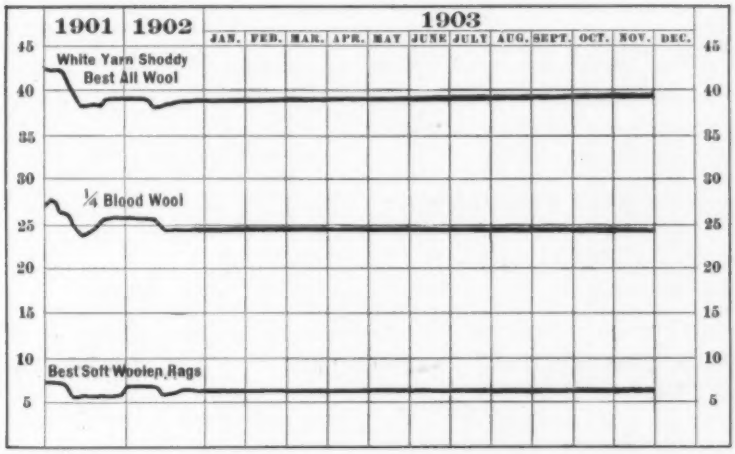

CHART SHOWING RANGE OF PRICES OF SHODDY, RAGS AND NOIL.

The Rag and Shoddy Market.

This market is dull and featureless. The unsatisfactory light weight season has made it impossible for manufacturers to use wool substitutes freely. Only a very small quantity of such stock can be used in light weight fabrics owing to the structure of the fabric. This in connection with the limited quantity of light weights made explains the prevailing dulness in the rag and shoddy market. Dealers realize these conditions and have been content to wait until the heavy weight season for goods offers something more favorable. Prices have been well maintained and while buyers have done their best to obtain concessions, there have been few cases where they have been successful. This is due to the conviction on the part of dealers that a lowering of prices would not be followed by sales. They are acting on the principle that business is dull because there is no demand for stock and not because prices are high, and that when manufacturers sell goods they will come around and pay for raw material at the present reasonable quotations: We quote as follows:

SHODDIES AND EXTRACTS.

White yarn, best all wool	38-40
White knit, all wool, best, fine	28-32
White knit, No. 2	23-25
Light yarn, extra fine	25-28
New pure indigo blue	23-25
Fine worsted, new black	26
New blue clip, best, fine	20-22
Dark mixed yarn, extra fine	22-24
All wool yarn, medium and coarse grades	15-20

Merino.

Fine light, all wool, No. 1	24-25
Medium light, all wool, No. 1	16½-17½
Medium light, all wool, No. 2	14-16
Fine black, all wool	20-22
Fine dark, all wool, best grade	20-21
Medium dark, all wool, No. 1	13-15
Medium dark, all wool, No. 2	12-13
Red knit stock, strictly all wool	19-20
Red flannel, all wool	19-20
Dark blue for hosiery, strictly all wool, No. 1	17-20
Dark blue for hosiery, not all wool, No. 2	12-14

DELAINE EXTRACTS.

Light	19-22
Medium light	15-17

WOOLEN RAGS.

Regular gray	12-13
Black	14-15
Fancy colors	16-20
Fine merchant tailors, all colors	9-11
Choice light colors	13-15
Browns	12-13
Blacks	9½-10½
Fine blues, plain	9-11
Fine dark	10-11
Medium dark	7-8

Worsteds.

Blue	16-18
Black	18-20

We quote as follows:

Serges.

New black	15-16
New blue	14-15

Flannels.

New scarlet	18½-22
New blue	17-18
Cloakings	3-4

SOFTS AND KNIT STOCK.

Soft woolens, best	7-7½
Old white flannels	14-16
White flannels, No. 2	11-12
Old red flannels	9½-10
Light blue flannels	7½-9
Old blue flannels	6-7
Old plaids	5-7

Cotton Waste For Sale.

Have large lines of Soiled Card, white and colored Oily Card and other Cotton Wastes suitable for the manufacture of Cassimeres, Satinets, Unions, etc. Also Combers and other clean Cotton Wastes for Hosiery, Underwear, etc.

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Amsterdam, N. Y.
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Contracts made with Cotton and Woolen Mills for Yearly Waste Production. Correspondence solicited. Shepperson's Code, 1878. Cable Address "Charles."

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GARNETTED STOCK, ETC.
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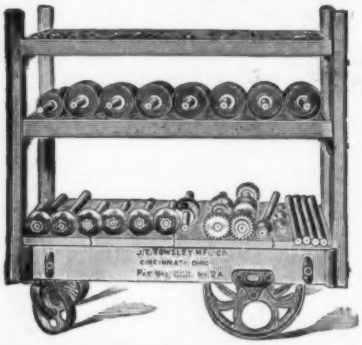

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GREAT TIME and LABOR SAVER.

Built without shelves or with any number desired.

Will be sent on trial.

TRUCKS For Dye Houses, Finishing Works Cotton or Woolen Mills.

White stockings	17-18
White hood stock	20-21
Clear hoods	9-10
Red stockings	9-10
Blue stockings	7-8
Fancy stockings, No. 1	7-9
Gray stockings	9-10
Black stockings	9-10
Knit stock comforters	6-7½
Red knit	9-10
Light gray knit	9-10
New light fancies	16-18
New fancies	12-14

Merinos.

Light, fine	13½-15
Light, coarse	7½-8
Fine, dark	12-13
Dark, No. 2	5-6½
Coarse dark	4-4½
Blue	12-13
Blue—seamed	13-14
Black—unseamed	12-13
New black	18-20
Small	3¼-4
Bunting	6-8

FLOCKS.

Shear, fine white, all wool	9-11
Fine indigo blue, all wool	9-9½
Fine black, and blue, all wool	7-8
Fine dark, all wool	5-6
Gig, fine, all wool	3-4
No. 1, black, all wool cut	6-7
All wool, fancy, shear and gig	2½-3½

COTTON WASTE.

No. 1 Spinners	9½-10
No. 1 Machine	7-7½
No. 2 Machine	5½-6
Machine Cop	7-7½
No. 1 Cop	8-8½
No. 1 Card	9½-10
No. 2 Card	9-9½
No. 1 Oily Card	4¼-4¾
No. 2 Oily Card	3¼-3¾
Egyptian Card	9¼-9¾
Peeler Combing	10¼-10¾
Egyptian Combing (scarce)	10½-11
No. 1 Linters	5¾-6
No. 2 Linters	5¼-5¾
White Clips	6½-7
Colored Clips	3½-5
No. 1 Picker	2¾-3¼

NOILS.

Australian	48-50
Fine domestic	38-40
½ Blood	24-28
⅜ Blood	22-23
¼ Blood	17-19
Braid	21-22
Carpet (white)	14-18
Carpet (colored)	10-12½

Seedy.

½ Blood	35-37
⅜ Blood	27-30
¼ Blood	23-26

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Dyers and Finishers of Dress Goods, Men's Wear and Cloakings, such as Venetians, Armures, Soleils, Crepons, also Silk Warp Fabrics, Cotton Warp Linings, Suitings, Clays, Serges, Worsted Damasks, Tapestries and Shirtings.

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Does the Best Bleaching at the Most Reasonable Rates?
TURKISH TOWELS, SKEIN YARN, TAPE, UNDERWEAR.
Send us a sample, we will show results and quote prices.
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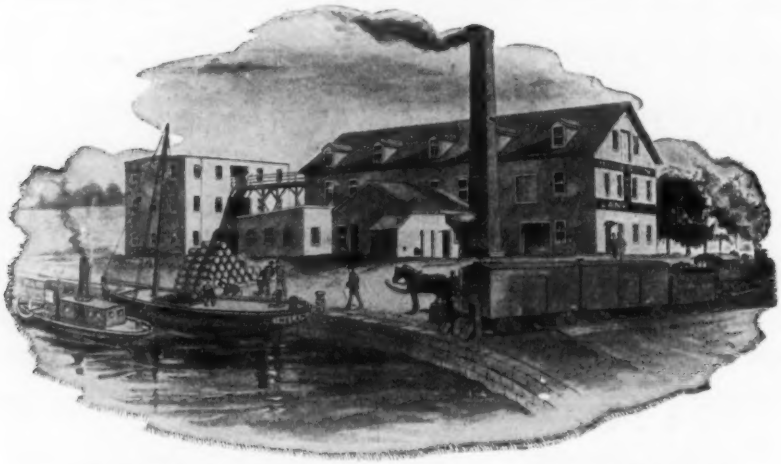

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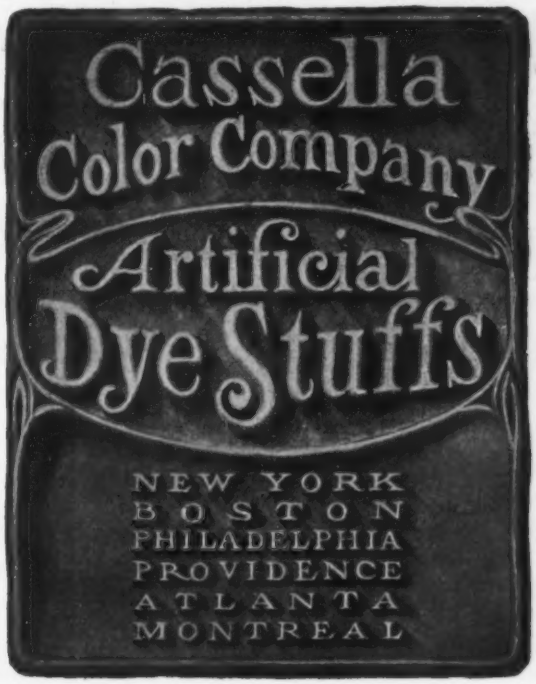
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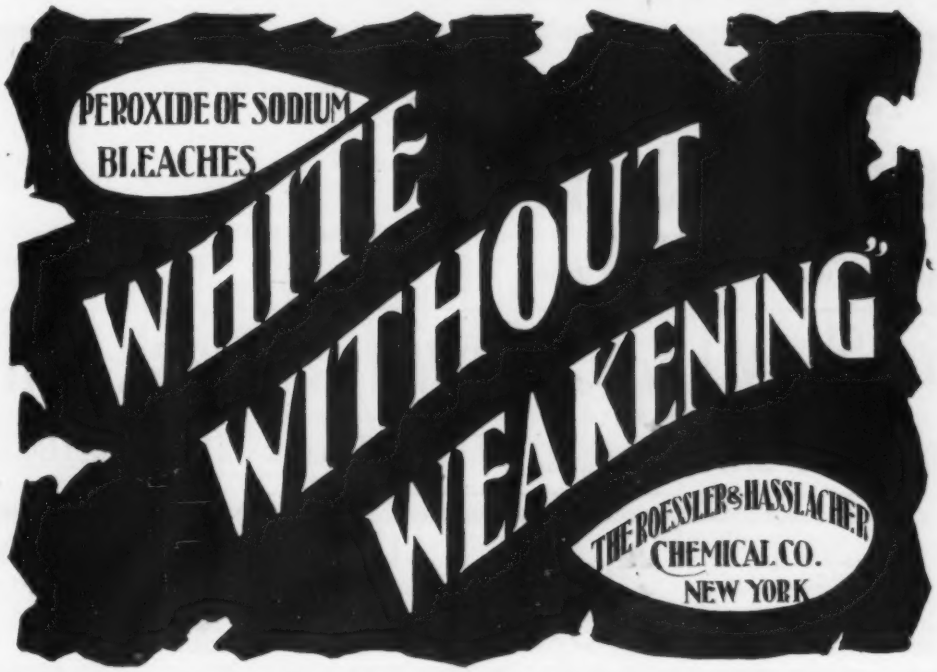
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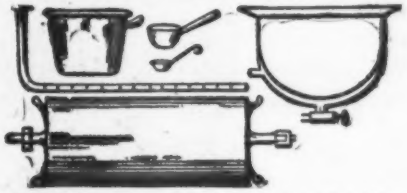

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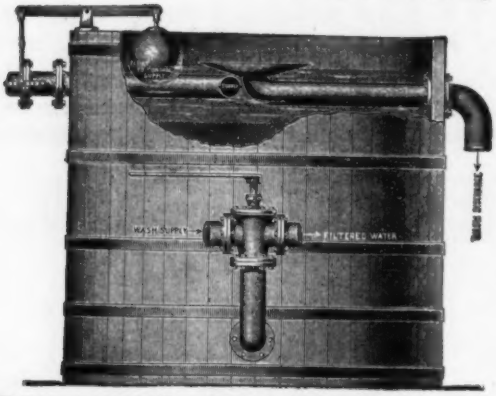
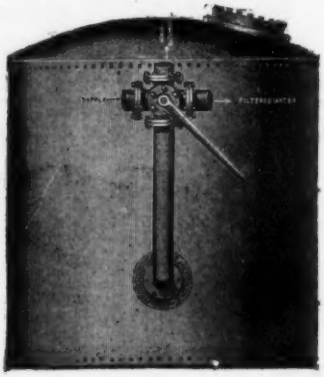




WILSON FILTERS FIRE HYDRANTS

Our filters are already in use in a number of the representative textile mills of the country, from whom we have received many expressions of satisfaction. Our representative will call and explain our system whenever desired.

TAUNTON-NEW BEDFORD COPPER CO.,

NEW BEDFORD, MASS.

Copper Printing Rollers, Singe Plates and Sheets.

OUR GUARANTEE: { Superior Quality. Prompt Shipments.

Dyeing, Bleaching, Printing and Finishing Machinery.

PAPER ROLLS,
STEEL ROLLS,
BRASS ROLLS,
WOOD ROLLS,
IRON ROLLS,
RUBBER ROLLS.

SPECIAL MACHINERY BUILT TO ORDER.

THE FRANKFORD MACHINE WORKS,

FRANKFORD, PHILA., PA.

We Build the Best

STEEL TOWERS AND TANKS

For Fire Protection.

DYE TUBS, VATS AND TANKS FOR EVERY PURPOSE.
DRAW LUGS FOR TANK HOOPS.

D. B. STEVENS & CO.,

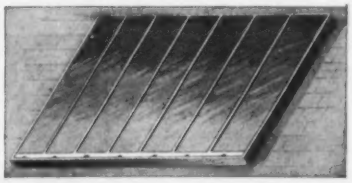
145-147 Turner Street. AUBURN, ME.

Let us send you our Catalog and Prices.

AUTOMATIC FIRE-PROOF

Patented Metal Window Frames and Sashes.

Positively Prevent Fire From Entering Building. Suitable for Office and Factory. Insurance Reduced to a Minimum.
Quick Shipments Guaranteed. Illustrated Catalogue Free.

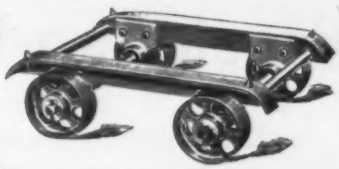


METAL SKYLIGHTS, CORNICES, FIRE-PROOF DOORS and SHUTTERS. Controlling Apparatus for Monitor-Sash.

DAVID LUPTON'S SONS CO., PHILADELPHIA, NEW YORK.

Gem Box Truck

YOU CAN'T BEAT OR BREAK IT. Send for sample and if not satisfactory can be returned at our expense. Look at the STEEL POINTS. Write for Prices. Manufactured by



CITY FORGE & IRON WORKS,
424 East First Street. DAYTON, O., U. S. A.

"Absolutely Safe and Reliable. Ask Your Friends."

A Gallon of Water

Weighs over eight pounds. What a risk you run by having a water tank on the roof of your factory. If it burst or fell it would result in great damage to your building and contents. Avoid danger and save money by placing your tank on a

Caldwell Steel Tower.

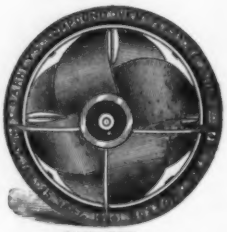
Your water supply will be improved and the pressure increased.

May we send our catalogue pricing these outfits?

W. E. CALDWELL CO.,
Louisville, Ky.

BARNEY VENTILATING FAN WORKS

ALBERT B. FRANKLIN, PROPRIETOR



FACE VIEW.

165-7 FORT HILL SQUARE

BOSTON, MASS.

FANS FOR REMOVAL OF

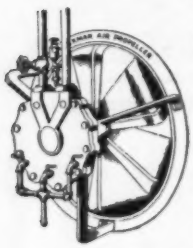
DUST, HEAT, ODORS, STEAM, SMOKE, MOISTURE AND GASES, AND FOR ALL SORTS OF . . . . . .

VENTILATION

MILLS, DYE HOUSES, SCHOOLS, THEATRES, ETC.

Blackman Fans

With Direct Connected Engines.



ECONOMICAL FIRST COST OPERATION

Can be run at any speed and any time. No long shafting and belts to waste power.

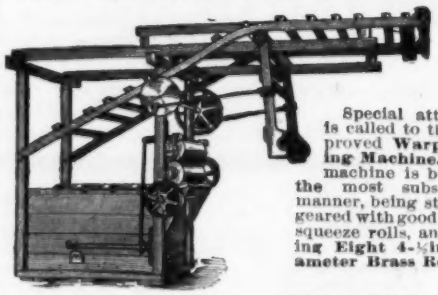
For Dye Rooms, Factories, Boiler Rooms, or where there is moisture or dust they are the best apparatus ever installed.

E. M. NICHOLS,

639 Arch St., - PHILADELPHIA, PA.

Write for particulars.

The Reliance Warp Dyeing Machine.



Special attention is called to this improved **Warp Dyeing Machine.** This machine is built in the most substantial manner, being strongly geared with good, heavy squeeze rolls, and having **Eight 4-½in. Diameter Brass Rolls.**

This machine, with our Improved Plater-down has met with marvelous success, and parties desiring machinery of this class, can make no mistake on ours For further particulars and prices, address

CHARLES HART,

Hedge and Brown Streets, ***FRANKFORD, PHILA.***

THE G. DROUVÉ CO.

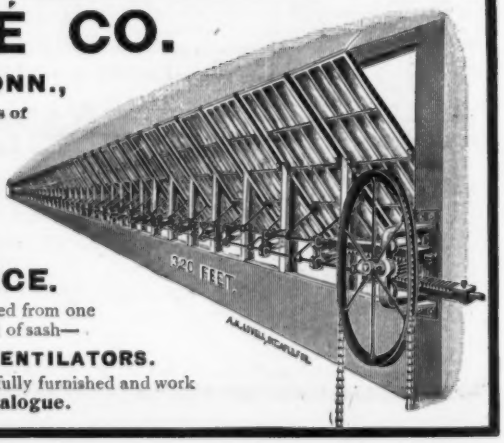
BRIDGEPORT, CONN.,

Manufacturers and Erectors of

SHEET METAL ARCHITECTURAL WORK.

Sole Manufacturers of

THE LOVELL WINDOW AND SHUTTER OPENING DEVICE.



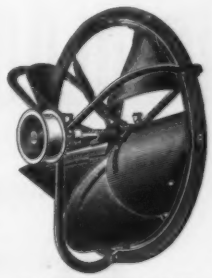
A line of sash 500 feet long can be operated from one station if desired. Adapted to any kind of sash—

SKYLIGHTS, CORNICES, VENTILATORS.

Correspondence solicited. Estimates cheerfully furnished and work guaranteed. **Send for Catalogue.**

We Admit it IS Remarkable

But every word in our new circular about the Berry System applied to Cloth Dryers, etc. is backed up by the mill owners' own statements. Many of these men did not realize that they were not getting the best possible results. You may be in an equally contented frame of mind. If you do not want to be disturbed from your quiet repose, better not read the circular, for it will make you uneasy in your mind until you have found out what we can do with YOUR dryer.



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INTERNATIONAL SPRINKLER CO. TRADE MARK REGISTERED

Main Offices and Works
PHILADELPHIA, PA.

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Actively represented all over United States and Canada.

Manufactures and installs sprinkler heads, dry valves and alarm valves. Universally approved by insurance interests. Write for full particulars.

A. J. BECKLEY CO.

284 Pearl St., New York City.

Perforated Copper

For Wool Scouring, Renser Boxes, Dyeing of Raw Cotton. Duster Screens, Picker Screens.

PERFORATED SCREENS OF ALL KINDS.

Factory, Garwood, New Jersey.

THE CYPRESS LUMBER CO.

TWO BIG FACTORIES.

TANKS

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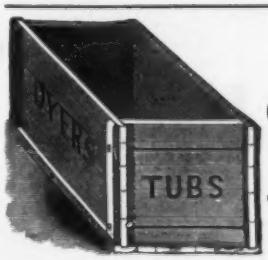
60½ and Media Streets, . . . PHILADELPHIA.

GAS ENGINES for city or country
BRUSHING MACHINERY
KNITTING MACHINERY

} **EFFICIENT**
DURABLE
LOW IN PRICE



Established 1868.

AMOS H. HALL, SON & CO.,

Manufacturers of

Cedar Vats and Tanks

2915-2933 North Second Street,

PHILADELPHIA, PA.

Tubs and Tanks of all kinds for Dyers, Bleachers, Factories, etc.

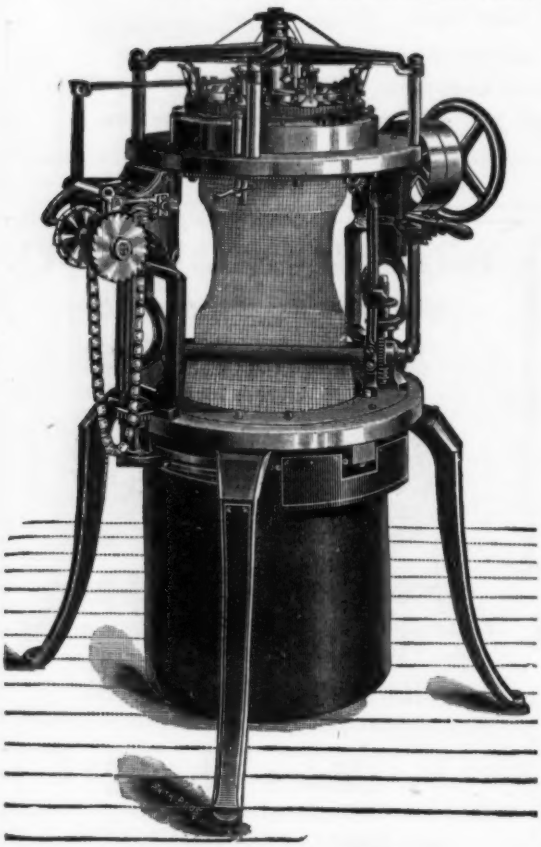
Down Town Office, 140 Chestnut Street, Corner Second.
Hours from 12 to 1.

McMICHAEL & WILDMAN MFG. CO.

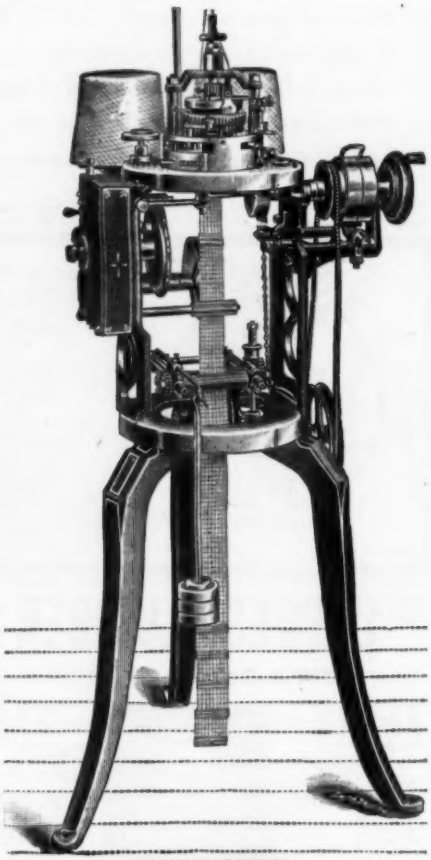
CIRCULAR RIB KNITTING MACHINERY

AUTOMATIC AND PLAIN

For all classes of Ribbed Hosiery and Underwear, Combination Suits, Sweaters, etc.



AUTOMATIC BODY MACHINE.



HOSIERY RIBBER.

ESTABLISHED REPUTATION FOR LARGEST PRODUCTION, BEST QUALITY FABRIC, DURABILITY, ECONOMY OF OPERATION

Full Particulars, Description and Samples Furnished upon Application to the

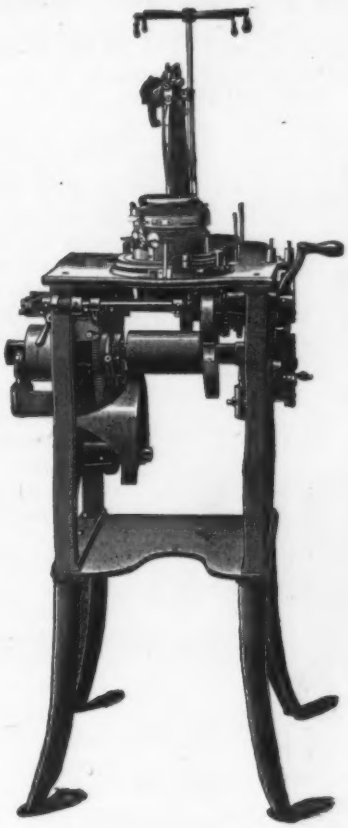
McMICHAEL & WILDMAN MFG. CO.

NORRISTOWN, PENN.

Acme Automatic Knitter

FOR SEAMLESS HOSIERY

ALL KINDS AND GAUGES



Best method of transferring ribbed legs and tops.

Greatest production of perfect work at least cost.

All latest attachments and improvements.

Our new type of machine, just out, having absolutely positive feed on pattern mechanism, which is set by dial, and graduated disc when changing styles and sizes, is one of the greatest improvements in knitting machines for a long time.

For particulars address

MAYO KNITTING MACHINE & NEEDLE CO., FRANKLIN FALLS, N. H.

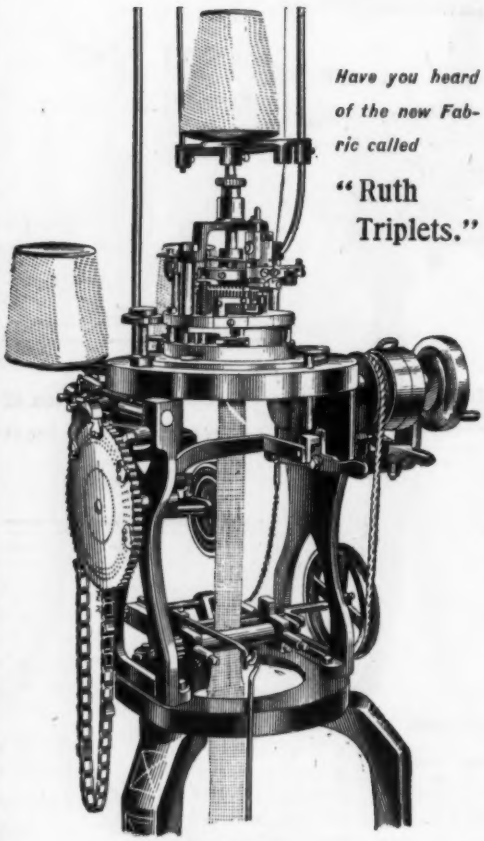
Philadelphia Office: Knickerbocker Building, Cor. 6th and Arch Sts.

We manufacture all kinds of Latch Needles of superior quality.

TO THE TRADE:

A Happy and Prosperous New Year.

TO OUR CUSTOMERS, as well as to all USERS OF PRODUCTS OF OUR MANUFACTURE, we desire to extend the COMPLIMENTS of the SEASON.



Have you heard of the new Fabric called

"Ruth Triplets."

PATENTEES AND MANUFACTURERS OF

Ruth Ribber, Ruth Sleever, Ruth Splicer, Ruth Automatic Stop Motion, Ruth Lace Device, Ruth Friction Pulley, Ruth Belt Shift, Ruth Needles.

To All Manufacturers of Knit Goods:

We desire to call attention to the full measure of HAPPINESS experienced by ALL those who have added to their successes during 1903 and who have been particularly fortunate by using the now celebrated RUTH RIBBERS, NEEDLES and other products of our manufacture.

The same is within reach of all. Why not make 1904 brighter by installing the RUTH machines having the highest EARNING power,—FIRST: On account of the increased production. SECOND: On account of the HIGH-GRADE FABRIC produced, with fewer "menders." THIRD: On account of the SIMPLICITY and DURABILITY of construction with ease of adjustment, the simplicity of construction and ease of operation make the teaching of new help a pleasure, and the durability brings the cost of repairs to a minimum.

New fabrics are being originated here from time to time, and our customers have taken advantage of this feature, reporting phenomenal runs on particular lines.

We have no salesmen, "our machines sell themselves." A TRIAL IS ALL WE ASK.

RESOLUTION for 1904: "Resolved that during this year we will try the RUTH products, if found to be all that is claimed for them, we will supply our needs with this line of RIBBERS, NEEDEES, etc." If you keep the first part of this resolution we know the second will not be "broken."

Write to-day for the sample machine you want.

May 1904 prove your BRIGHTEST and BEST, is the wish of,

Yours, "right-up-to-date,"

RUTH AUTOMATIC KNITTING MACHINE CO. Box T-W, **YORK, PA.**

Every machine guaranteed to do the work for which it is constructed. Why hesitate?

Friedberger Mfg. Co.

ALWAYS IN THE LEAD

OUR

Fall 1904 Line

now ready and being
shown by our

Salesmen and at the Mills

GERMANTOWN, PHILA.

P. O. ADDRESS, LOGAN STATION, PHILA.

NYE & TREDICK COMPANY,

MANUFACTURERS OF

Circular Rib Knitting Machinery,

UNDERWEAR MACHINERY,

For Ladies' Vests, Combination Suits, Corset Covers, etc., Men's Underwear, Sweaters, etc.

New Improved Sleeve Machines, Machines for Rib Hosiery, Rib Tops and Cuffs.

LATEST IMPROVEMENTS ON ALL MACHINES.

MECHANICAL STOP MOTIONS

For Circular Rib Knitting Machines.

OFFICE AND SHOW ROOMS:

606 ARCH STREET, PHILADELPHIA.

The "INVINCIBLE"

A machine of the highest grade.

Practical and Economical in operation.

A Big Producer.

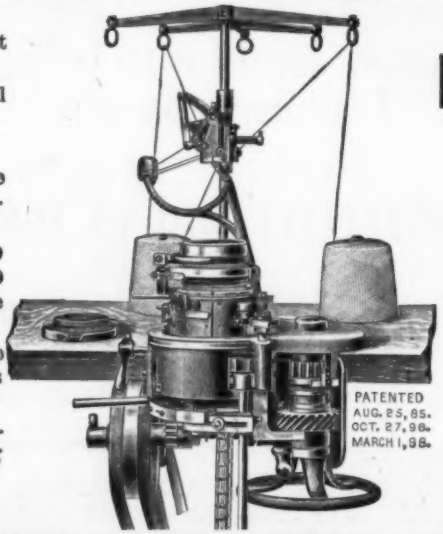
Gauge of machine changed by simple changing cylinders.

The Invincible METHOD OF TRANSFERRING RIBBED TOPS is quicker and more positive than others.

No experience required to transfer ribbed tops by this method.

YARN CHANGED automatically without revolving bobbins.

Write for Catalogue.



Full Automatic Knitting Machine

For all kinds and gauges of

SEAMLESS HOSIERY

PAWTUCKET, R.I. U. S. A.

E. JENCKES MFG. CO.

BRANCH OFFICE, Room 370, Bourse Bld'g, PHILADA, PA.

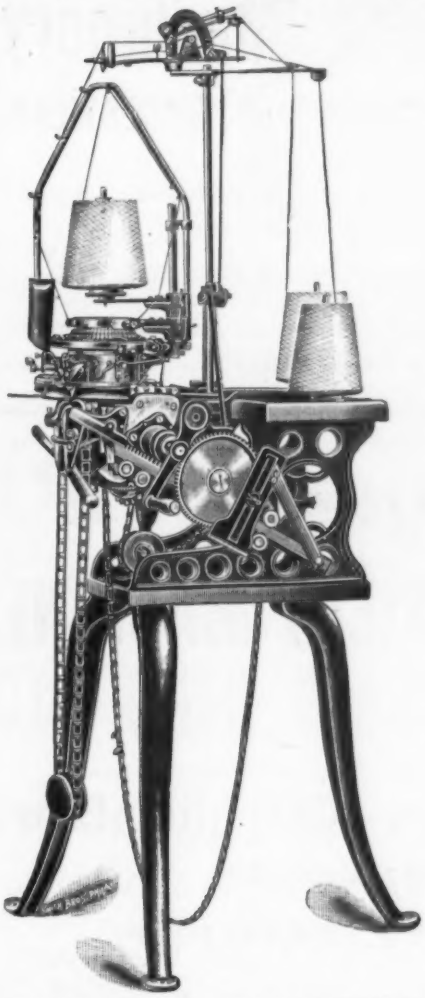
R. M. OATES, Selling Agt., HENDERSONVILLE, N. C.

EXCELSIOR

Knitting Machine Mfg. Co.

BUILDERS OF

KNITTING MACHINERY



Two-Feed 7-8 Automatic for Ladies String Work, also Black Legs with White Feet.

Regular 7-8 Automatic for all classes of Cotton Hose. Special 3-4 Automatic for Wool.

Allentown, Pa., U. S. A.

The

"Hemphill"

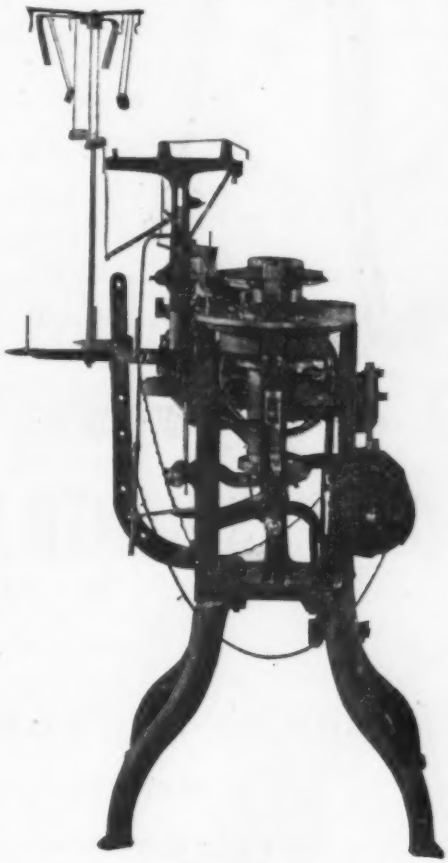
More Production!

Less Power!

One single 5-8 belt does the driving.

Change of Guage { SIMPLE AND INEXPENSIVE.

The Adjustments of this machine are reduced to the minimum. Do not require an expert to make them.



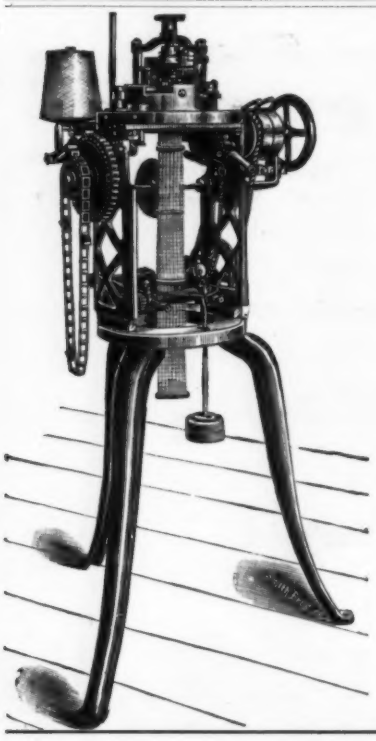
SIDE VIEW.

Full Automatic Hosiery Knitter.

HEMPHILL MACHINE CO.,

Pawtucket, R. I.

Philadelphia Agent, E. A. NEWTON, 245 Race Street.



H. Brinton & Co.

213-215 Race Street, Philadelphia, Pa.

BUILDERS OF

Knitting Machinery

For HOSIERY and UNDERWEAR.

Complete Estimates Furnished. Send for Particulars.

The cut shows our **Improved Automatic Ribber** with Welt and Slack Course for Half Hose, Tops and Ribbed Legs.

THE BEST

FULL-FASHIONED HOSIERY MACHINES

Simplicity, durability, large production, fine work are the characteristics of the machines for knitting fashioned hosiery made by the

Chemnitzer Wirkwaaren-Maschinenfabrik

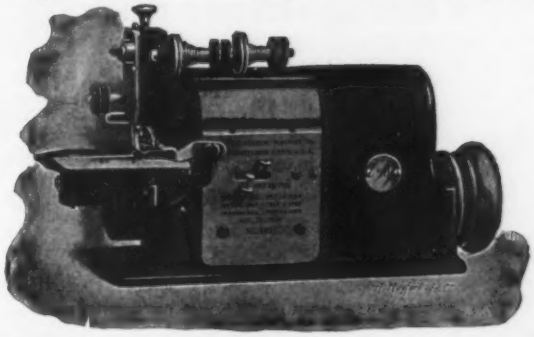
(FORMERLY SCHUBERT & SALZER)

CHEMNITZ, GERMANY.

Representative for the United States,

OTTO WALTHER, 591 Bourse Building, Philadelphia.

THE CHEAPEST and BEST METHOD
OF
FINISHING RIBBED KNIT GOODS
IS BY THE USE OF
OUR HIGH SPEED MACHINES.



BLANKETS, SKIRTS or COTTON GOODS,
requiring a useful and Ornamental Finish, should be finished by some of our various machines adapted for special purposes and finishes.
Send for Catalogue and Samples, stating the kind of goods to be finished.

THE MERROW MACHINE CO.,
346 Broadway, New York. HARTFORD, CONN. Bourse Bldg., Phila.

Universal Cutter Co.
4567-4569 SCOTT AVE., ST. LOUIS, MO.

FRED BAUMANN, Jr., Eastern Mgr., 467 Broadway, NEW YORK.

CUTTING MACHINES

Made to be operated by direct current, 110 or 220 volts.

What electric current have you?

UNIVERSAL CUTTER will do the work BETTER and cut a GREATER quantity of Knit Underwear, or Fleeced Materials, than any other Cutting Machine on the market. : : : :

Made in 3 sizes Circular Knives:—Gem, 3 1-4 inch Knife, weight 15 lbs.; Prima, 4 inch Knife, weight 24 lbs.; Giant, 5 1-2 inch Knife, weight 27 lbs. Two sizes straight or Reciprocating Knives. Send us sample of material you desire to cut, stating thickness you want to cut at one time, and we will advise you as to which size is best adapted to your wants.

JAMES TAYLOR,

835 Arch Street, - - - Philadelphia, Penn.

KNITTING MACHINERY

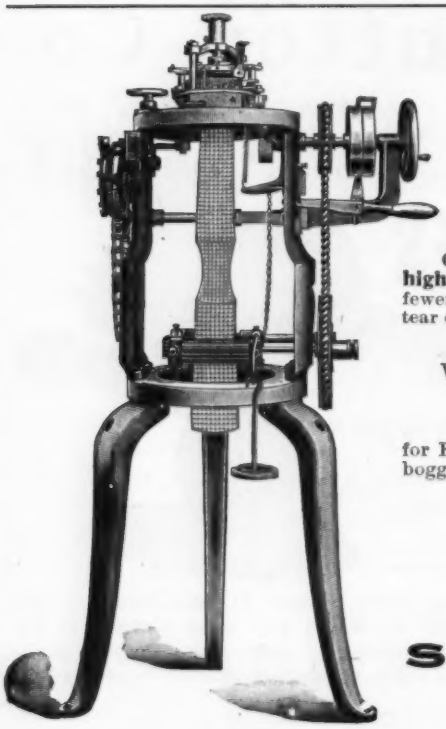
OF ALL KINDS. **NEW AND SECOND HAND.**

A RARE OPPORTUNITY TO BUY.

31 Mayo Acme 3¾—176 needles.
20 Mayo Acme 3¾—136 needles.
50 New Victors, various sizes.
28 Beattie & Hepworth loopers.
3 Cornely embroidery machines.
10 Hosiery presses (Lever).
3 Screw presses.
1 Hollow plate press.
40 Lamb and Grosser flat knitters.
150 Ribbed underwear machines, various sizes and makes.
1 Speed lathe.
1 Sensitize drill.
60 Brinton & Co. 3-4 aut. knitters, sizes.
27 Standard A machines, 3¾ in., 160 needles.
56 Union Special machines.
100 Brooks welters.
98 Brinton & Co. and other make hosiery ribbers.

WRITE FOR COMPLETE LIST.

We are always in the market to buy good second-hand Knitting and Finishing Machinery.



High Speed Rib Knitting Machinery.

Our latest model machinery has been designed to run at **very high speed**, giving large production. This is accomplished with fewer seconds, less breakage of needles, less jar and wear and tear on machines than has been customary at lower speeds.

We also make Special

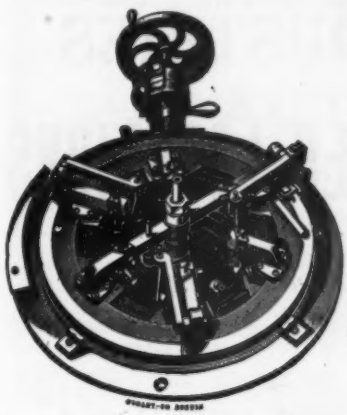
STRIPING AND DESIGNING MACHINES

for Fancy Golf Stockings, Bathing Suits, Sweaters, Toques, Toboggan Caps, Skirts, etc.

Our Machinery gives large production at low cost and enables manufacturers to meet the market always and make a profit.

STAFFORD & HOLT,

LITTLE FALLS, N. Y.



CIRCULAR KNITTING MACHINES

Either plain or full automatic, with stop motions complete, for

Ribbed Underwear, Sweaters, Cardigans, Cuffs and Anklets.

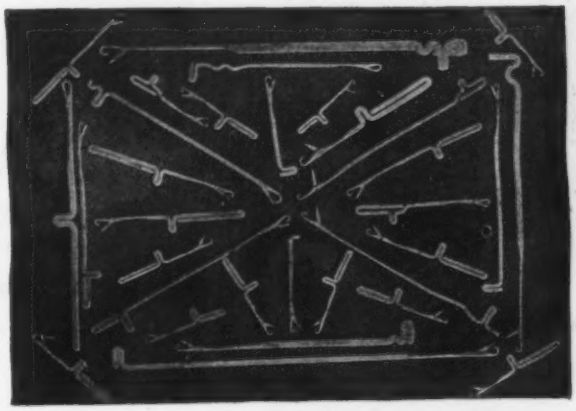
The Leighton Circular Machines are the only ones which **Rack** or **Shog** the needles for fancy borders; also built for automatic striping; and with from 4 to 16 feeds for underwear.

Also Builders of ABEL WINDERS, SEAMERS and LOOPERS.

LEIGHTON MACHINE CO.,
Manchester, N. H.

Latch Needles

For all Knitting Machines.



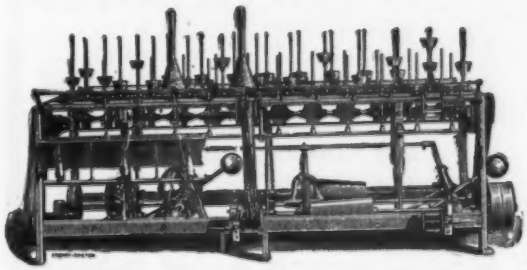
Our Superior or Sunken Rivet Head Needles

Will save you money every day in the year.

Dodge Needle Co., Manchester, N.H.

We now build, with or without differential motion, for winding on Bobbins from Skein or Cop,

THE ABEL WINDERS



ALSO THE

Abel Seamers and Loopers

IN CONNECTION WITH OUR LINE OF

AUTOMATIC RIB KNITTING MACHINERY.

LEIGHTON MACHINE CO., Manchester, N. H.

The "New" Victor Knitting Machine

A Full Automatic Seamless Machine, thoroughly interchangable in all its parts.

More simply constructed than any machine on the market.

Full Automatic Two-Color Striping Machine

Full Automatic Combination Lace and Stripe Machine

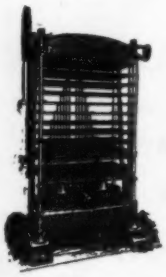
American Knitting Machine Co.,

Office and Works:

Oxford Street, between Mascher and Hancock,

PHILADELPHIA, PA.

The CRAWFORD



HOLLOW STEAM

PLATE PRESS

For Knit or Woolen Goods.

The most reliable machine of the kind on the market.

PRESS PAPERS and FENDERS.

SPENCE & RIDEOUT,

Successors to
J. J. CRAWFORD & SON,

NASHUA, N. H.

Established 1868.

INDUSTRIES

ARE

OFFERED LOCATIONS

WITH

Satisfactory Inducements,
Favorable Freight Rates,
Good Labor Conditions,
Healthful Communities,

ON THE LINES OF

THE ILLINOIS CENTRAL R. R.

AND THE

YAZOO & MISSISSIPPI VALLEY R. R.

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Industrial Commissioner,

1 Park Row, CHICAGO, ILL.

Textile Mills

Located along the lines of the

Southern Railway and Mobile & Ohio Railroad

Have met with steady and remarkable success. There are yet available in the territory traversed by the above roads,

Excellent Sites

where COTTON MILLS, WOOLEN MILLS, KNITTING MILLS or any class of textile plant for which the owner seeks a location, can be successfully established and operated to great advantage,

Parties interested should address

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PAXTON & O'NEILL'S

3-4 AUTOMATIC KNITTER

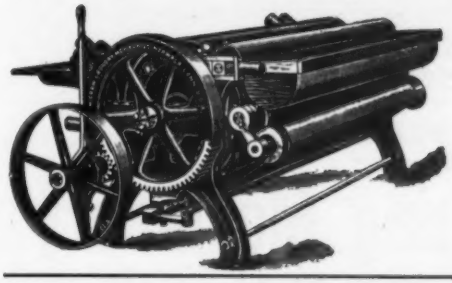
FOR ALL KINDS AND GUAGES OF SEAMLESS HOSIERY.

Has the preference wherever used over 7-8 and full automatics. Because it makes as much or more goods and better goods. Costs less for repairs. Gives less trouble to fixers. Range on Half Hose, from the coarsest to 260 needle.

Exclusive rights to BROWN'S ATTACHMENTS FOR LACE EFFECT.

Cylinders and Dials for all size Machines. **127 Bread Street, Phila.**

AUTOMATIC IRONING and PRESSING MACHINE for KNIT GOODS.



This machine irons and presses ribbed and flat underwear, giving a fine, smooth finish and most attractive appearance to the goods, not to be obtained in any other way. It does not break buttons. Inexpensive and easy to operate, and has large capacity. Knitting mills using them are greatly pleased with results. This method of finishing is sure to come into universal use. Send for further particulars to

J. W. CRAW LAUNDRY MACHINERY CO.,
SOUTH NORWALK, CONN.

HEPWORTH & CO.'S

Patent Single-Stitch

LOOPING MACHINE.

Needle working from the inside, avoiding the breaking of needles and points and picking up the metal.

Single and Double Stitch, or Both Combined.

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HOSIERY FINISHING BOARDS.

BEST WORK. PROMPT SERVICE. PRICES ALWAYS RIGHT.

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Hosiery Boards.

New Automatic Power Neck

AND CENTRE MARKING MACHINE (Patented)

For Marking or Crimping the Neck and Centre of Garment for Cutter. The original and best machine in use for this purpose. Fully covered and protected by Letters Patent.

Special Machines for Knitting Mills

Band Folding and Cutting Machines, Power Neck Marking and Shaping Machines, Hand and Power Cloth Cutters, Flat Rib Cutters, Folders and Winders, Loopers, Hot Roll Folders, Eyelet Machine, Irregular Form Cutting Machines.

ALSO FULL LINE OF KNITTING MILL SUPPLIES. Send for Circulars

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Importer and Builder of

Full Fashioned Knitting Machinery

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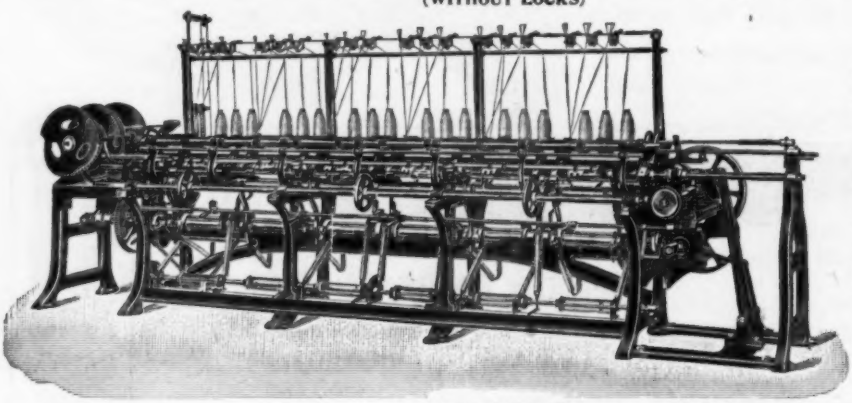
WALTER SCHOEBEL, 110 Penn St., BROOKLYN, N.Y.

SOLE AGENT FOR THE UNITED STATES FOR

NEW The "Record Narrowing" Flat Knitting Machine NEW

(WITHOUT LOCKS)



The "Record" excludes any breaking of needles.

The "Record" runs very lightly and with the greatest quietness.

The "Record" narrows after a new method.

HIGH PRODUCTION.

BUILT SOLELY BY

IRMSCHER & CO., Dresdener Knitting Machine Factory, DRESDEN, SAXONY.

This new invention, working after an entirely new method, is a combination of the COTTON and FLAT Knitting Machine with Automatic Narrowing Apparatus, for the production of full fashioned goods, seamless legs of ladies' hose, plain, seamless drawers, Shaker and cardigan sleeves, etc.

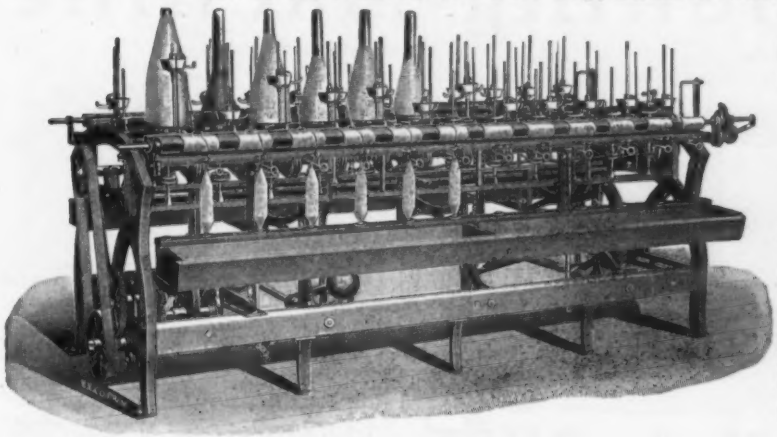
"THE RECORD" is also built without narrowing attachment for making 2 and 2 ladies' vests, shaker bodies, sweaters in 1 and 1 half and full cardigan, rib tops, etc.

All goods produced on the "Record" have more elasticity and are of finer manufacture than any other machine of its kind.

SPECIAL HAND AND POWER MACHINERY FOR FANCY GLOVES, SWEATERS, GOLF HOSE, LADIES' BLOUSES, ETC.

OVER 1,400 PAYNE WINDERS IN USE

For Hosiery Mfrs., Wind for Cop, Skein or Bobbin.



G. W. Payne. G. M. Fanning.

GEO. W. PAYNE & CO

[Est. 1865, Payne & Mathewson.]

Builders of the

Improved

Upright Spoolers,

To Spool from Cop, Skein or Bobbin.

Doubling Spoolers, for doubling 2, 3, or more ends into one,

Upright Quillers, Quill from Cop, Skein or Bobbin.

Ring Dresser, Spooler and Reel Spindles, Cop Skewers, Warp, Spool, Spooler, Guides, Bolsters and Stops Made and Repaired at Short Notice.

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Pawtucket, R. I.

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KEYSTONE FULL AUTOMATIC KNITTER.

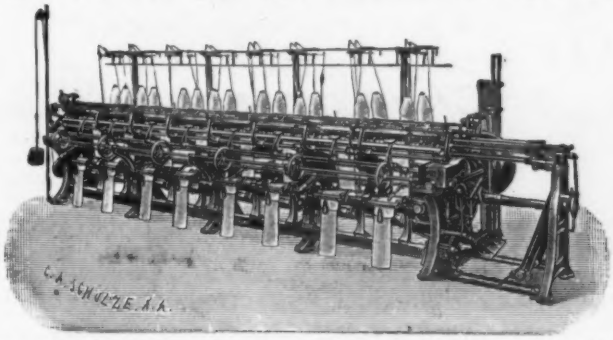
The simplest machine of the kind ever built. A small bench machine running with a 3-4 inch belt. Can be used with two cylinders, or transfer points if desired. Positive thread splice. All parts interchangeable. Call and see it in operation in our offices.

MANUFACTURERS OF LATCH NEEDLES

We can furnish you needles for any make of machine that you use. We number among our customers, the best known mills in this country. We will be pleased to estimate on any line.

KEYSTONE KNITTING MACHINE MFG. CO., 2600 North Sixth St,, Philadelphia, Pa.

SEYFERT & DONNER, CHEMNITZ, GERMANY.



BUILDERS OF ALL KINDS OF

Flat Knitting Machines

(LATCH NEEDLES)

Inventors of the S. & D. Narrowing and Widening Machine.

Improvements for Power Machines ELECTRIC STOP MOTION. DOUBLE MOTION OF PATTERN-CHAIN, no long chains required. AUTOMATIC STRIPING APPARATUS, for 6 Colors. Fancy Knitting Machines with New Jacquard Mechanism similar to the Weaving Jacquard. Patent Brushes for latch opening. More than 30 different models of HAND-KNITTING MACHINES.

Patentees and sole makers of the "TEUTONIA," best and quickest hand-knitting machine for hose and half hose. Griswold heel, narrowed toe.

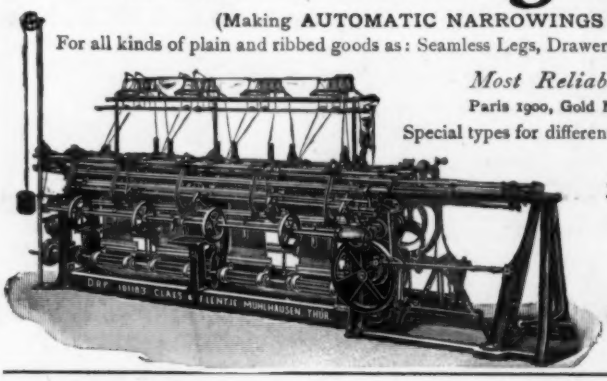
Sole Agent for the United States, JULIUS MULLER, 132 Melrose Street, Brooklyn, N.Y.

FULL AUTOMATIC

Fashioning-Machine

(Making AUTOMATIC NARROWINGS and WIDENINGS)

For all kinds of plain and ribbed goods as: Seamless Legs, Drawers, Combinations, Sleeves, Suits, Blouses, etc.



Most Reliable and Productive Machine!

Paris 1900, Gold Medal! Paris 1900, Gold Medal!

Special types for different articles. Number of heads to order.

Automatic Sweater Machine

With Independent Heads, Latest Improvements.
Recognized as "The Best"

Ask for samples and particulars, state gauge and size you need.

Claes & Flentje
MÜHLHAUSEN, THÜR, GERMANY

WILLIAM C. BULL,

BENNINGTON, VERMONT.

For Ladies', Gents', and Children's Goods.
LATEST STYLES.
BEST WORKMANSHIP.

MAKER OF

Drying Form Boards

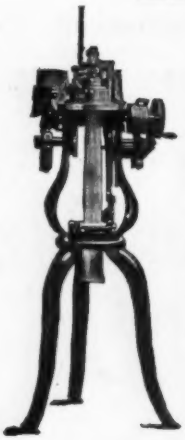
OF EVERY VARIETY.

Pepper Machine Works

Lakeport, N. H.

Successors to
Pepper Manufacturing Co.

Manufacturers of



Knitting Machinery,

INCLUDING

Pepper's Flat Ribbed Cuff Machines,

Automatic Welt and Loose Course Machines for Stock Tops. New Circular Stripers with Welt, Loose Course and Striping (Automatic), for Short Cuffs, Sock Tops, Hose Legs, Wristers, etc.

Golf and Bicycle Stocking Machines,

ALL KINDS OF

CIRCULAR RIBBED MACHINES

For Men's Underwear, Ladies' and Misses' Hose Legs and Leggins. Correspondence Solicited.

Stanton & Lewis

CENTRAL STEAM FORGE

316 and 318 Florist St.,

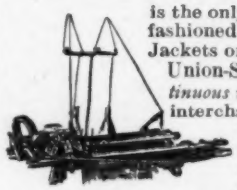
PHILADELPHIA .. .. PENN.

The best equipped shop in the United States for the Manufacture of

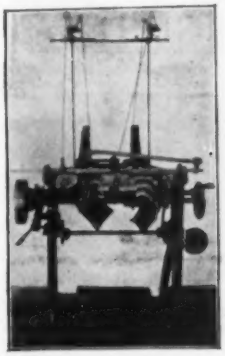
Knitting Machine Cylinder

and Sinker Bed Ring Forgings, from the smallest to 30 in. dia. of the best steel.

The Grosser PATENT FLAT KNITTING MACHINE



is the only reliable machine for full-fashioned Sweaters, Cardigan or Golf Jackets or Vests, Gloves, Underwear, Union-Suits, etc., that gives *continuous* satisfaction. All parts are interchangeable on our new style. The only automatic Machine for Jacquard Honey-Comb or Seamless Shaker Sweaters. We have the only first class High Speed 2 thread Lockstitch Overseamer for selvedged Knitgoods, that will sew in Sleeves or hem in double Bottoms on Sweaters without puckering. ***ARTHUR MUELLER, 780 Madison St, Brooklyn, N. Y. Telephone 665a Bushwick.***



Germantown Hosiery Machine Works

LINDLEY'S NEW AUTOMATIC POWER GLOVE FINGERING MACHINE

Germantown Skein Winder and Links for Double Ribs. Cardigan Jacket and Circular Knitting Machines for Shirts and Hosiery.

Cylinders and Dials of all kinds made and hardened. Special Machine and Jobbing Work promptly attended to. Also equipped to do general repairing of Platt's Cotton Spinning Machinery. Correspondence solicited.

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DRYERS

Now is the time to fit your Drying Rooms.

We offer the cheapest and best Dryer ever offered to the trade.

Correspondence and Inspection Solicited.

We are also manufacturers of:—

Hydro-Extractor Guards,
Crimping Machines,
Neck Binders,
Table Legs, and
Gusset Cutting Machines.

Johnston Novelty & Mill Specialty Co.

No. 115 Genesee St., Utica, N. Y,

H. C. LONG, New England Sales Agent, Hartford. Ct.

National Spring-Beard Needle MACHINE

For Seamless Hosiery.

The only Machine on which the speed is advertised.

This Tells the Whole Story.

Best results guaranteed at 300 to 400 revolutions per minute, according to guage, hence the largest production by 25 to 40 per cent. overall other machines. Least cost for repairs, smallest needle breakage and lowest per cent. of menders. Full automatic, practical double-sole and high-heel splicer. Device for producing a great variety of lace effects, with no breakage of stitches and no infringement.

For full particulars, call or address

NATIONAL AUTOMATIC KNITTER CO.,

724, 726, 728 Cherry Street,
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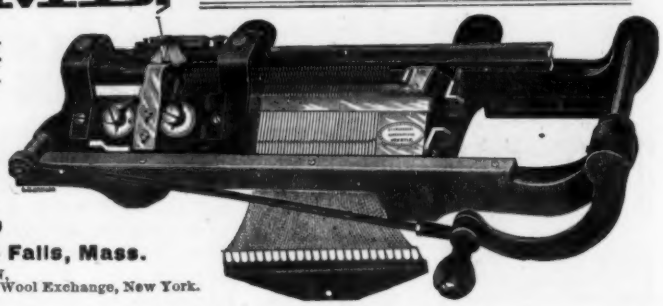
The LAMB, LEADER OF KNITTERS,

Original and Still the Best.

Most widely used; being operated in every civilized country in the world. For description, prices, etc., see catalogue.

CIRCULAR MACHINES,
RIB TOP and
SEAMING MACHINES.



LAMB KNITTING MACHINE COMPANY,

P. O. Box 5888, Chicopee Falls, Mass.

J. E. WOODHEAD, 100 22d St., Chicago.
L. D. SANBORN, Room 505 Wool Exchange, New York.

THE BEST

Full-Fashioned Hosiery Machines

Simplicity, durability, large production, fine work are the characteristics of the machines for knitting fashioned hosiery made by the

CHEMNITZER

WIRKWAAREN - MASCHINENFABRIK

(Formerly Schubert & Salzer)

CHEMNITZ, GERMANY.

Representative for the United States,

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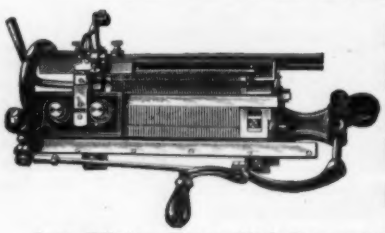
Best Knitting Machines

IMPROVED CONSTRUCTION

For Hand and Power Driving.



High Speed, Excellent Workmanship.

Auto. Rib-top, Fancy-stitch Jacquard Machines.

Everywhere in work. **80,000** Machines sold.

CLAES & FLENTJE,

Muhlhausen, Thür, Germany.

Standard Machine

Superior to All Others in Economy of Operation, Production and Fabric.

Best Built, Easiest Operated, Superior Fabric.

STANDARD B, Automatic Double Sole and all Improvements.

STANDARD C, the only Automatic Heel and Toe Changer.

STANDARD D, Automatic Striping Machine, none other in the market.

STANDARD MACHINE CO.

508 Ludlow St., PHILADELPHIA, PA.

Estimates Furnished for Complete Hosiery Plant.

L. T. IVES CO.

Manufacturers of all kinds of

SPRING KNITTING NEEDLES

NEW BRUNSWICK, N. J.

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MANUFACTURERS OF

LATCH NEEDLES

of all kinds. Warranted in every respect.

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Spring Knitting Needles

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AMSTERDAM, - N. Y.

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MANUFACTURER OF

Screw Riveted Balmoral and Double Rib

NEEDLES

(Patented May 6, 1890.)

All Work Guaranteed. MANCHESTER GREEN, CONN.

WM. COREY CO.,

Manufacturers of Knitting Machine

Latch Needles,

MANCHESTER, N. H.

EXCELSIOR NEEDLES.

The best Hosiery Needles in the market.

Manufactured by

WARDWELL NEEDLE CO., Lakeport, N. H.

Manufacturers' Supplies Co.

418 ARCH STREET, PHILA.

Needles and Supplies for Knitting Mills.

Agents for EXCELSIOR NEEDLE CO., and NATIONAL NEEDLE CO.

FREEMAN BROS.

Manufacturers of

Latch Needles

Harmony Block, BRATTLEBORO, VT.

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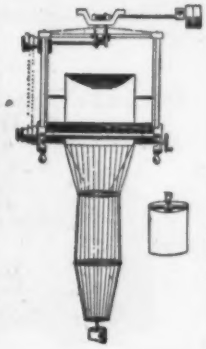
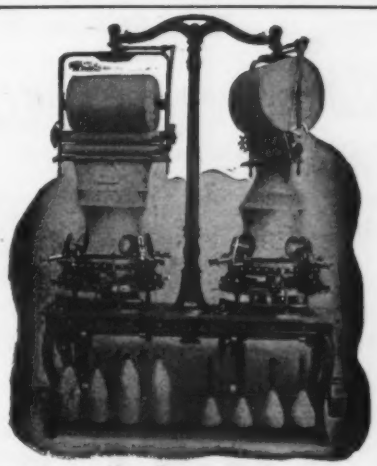


If you are using my

Patent Vertical Dryer

YOU are satisfied. If not, you never will be until you have them. You cannot afford to use any other. So prominent mill men tell me. Sooner or later all will have to have them. Made and sold only by

E. M. ANTISDEL,
Utica, N. Y.



TOMPKINS BROS. Troy, N. Y.
Knitters, Winders, Burrs, Attachments.

Beatties'

PATENT LOOPERS

Wm. Beattie & Son,

COHOES, N. Y.

An Illustrated Catalogue will be sent on application.

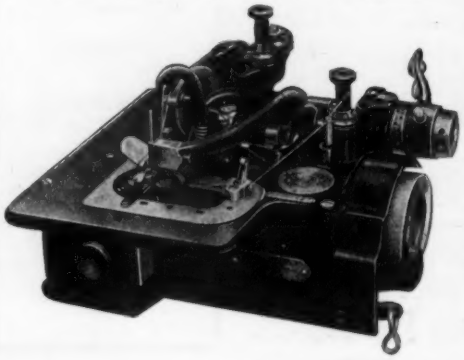
WILLCOX & GIBBS

"OVERLOCK" Machine.

(TRADE MARK.) (Pat. April 5, 1892.)

Patent twice upheld by the U. S. Court of Appeals.

For
Trimming, Seaming (or Hemming or Overedging) and Covering Raw Edges of Knit Underwear and Hosiery
in
ONE OPERATION
and for making
"Overlock" Corded Edge on Lace Curtains, Silks, Ribbons, etc.



WARNING!

Manufacturers and dealers are warned that not only is the "Overlock" Machine fully protected by patents, particularly our four patents of April 5, 1892; one of May 26, 1896 and one of August 11, 1903, but the edging products are also protected by patents of March 10, 1896, Dec. 26, 1899 and August 11, 1903.

Trade Mark Registered

Business Estab. in 1859

WILLCOX & GIBBS SEWING MACHINE COMPANY,

GENERAL OFFICES
TEMPORARILY AT
85, 87, 89 BLEECKER STREET,
CORNER MERCER STREET, NEW YORK.
BRANCHES: LONDON, PARIS, MILAN, DRESDEN.

Until completion of the New 12 Story Fireproof Building,
658 BROADWAY, Corner of Bond St.
THE OLD "WILLCOX & GIBBS" CORNER
where we were located for thirty-five years.

CELEBRATED BRAND PYRAMID (TRADE MARK) **LACINGS**

For Underwear, Overshirts and Sweaters,

JOHN CATHCART & CO.,

115 Franklin Street, NEW YORK.

LACINGS FOR OVERSHIRTS and UNDERWEAR.

Tipped and Tasseled.

Hepner & Horwitz, 30 Howard St., N. Y.

A FAST FAST-BLACK

I offer to large and important establishments, a process of dyeing fast black on hosiery. It is superior to the best European processes. It is not an experiment—a few of the largest knitters in the U. S. are successfully using it.

WE GUARANTEE

A Deep Shade of Brilliant Blue Black

Guarantee
- An Average Natural Gain of Weight of 10 per cent.
- A Cold Process, insuring Maximum Strength and Softness.
- Quickest, Safest, most Reliable and Cheapest Process, without the Need of Skilled Help to do Perfect Work.

FAST, FAST-BLACK.

Guarantee Fast to Wear.
" " " Exposure, Light, Gas, Etc., Etc.
Guarantee Fast to Perspiration, Acids, Etc.
Guarantee Stainless, no Crocking.
" Free from Lint.
" " " Bleeding, Wash Proof.
Guarantee Strongest Fibre,
" Pure Dye, Free from all Impurities.
Guarantee Unaffected by Repeated Washings.

A Thorough Oxydation, Dyeing Through and Through the Fibre, so Essential to Wearing, and not only on the Surface, Like on Sulphur or other Direct Blacks.

Guarantee Such Uniformity as to Avoid Pairing of Goods at All Times.

CHAS. E. WILD, .. Lansdowne, Pa.

Charles Cooper

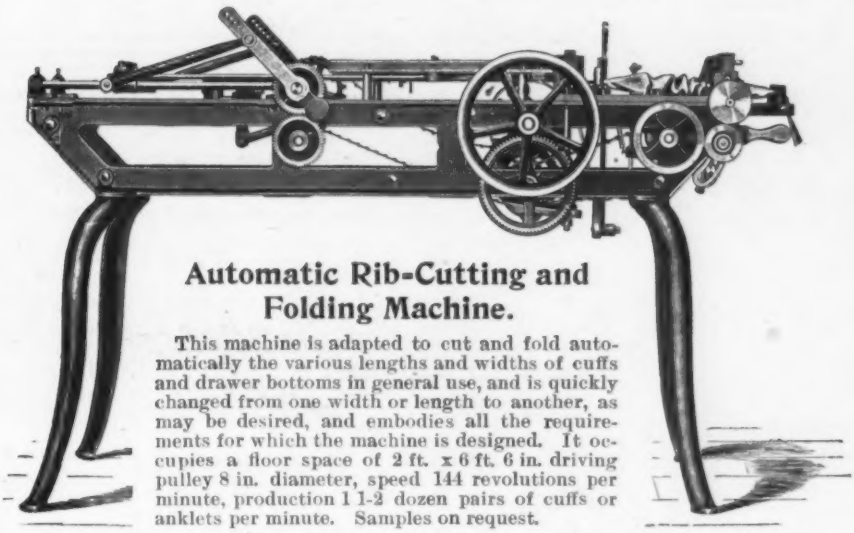
BENNINGTON, VERMONT

MANUFACTURER OF

Knitting Machinery

SPRING NEEDLE CYLINDER RIB-TOP MACHINES For making Cuffs, Drawer Bottoms and Shirt Borders.

SPRING AND LATCH KNITTING NEEDLES, BURR WHEELS, BURR BLADES, SINKERS, JACKS, ETC. COLLARETTE ATTACHMENT.



Automatic Rib-Cutting and Folding Machine.

This machine is adapted to cut and fold automatically the various lengths and widths of cuffs and drawer bottoms in general use, and is quickly changed from one width or length to another, as may be desired, and embodies all the requirements for which the machine is designed. It occupies a floor space of 2 ft. x 6 ft. 6 in. driving pulley 8 in. diameter, speed 144 revolutions per minute, production 1 1-2 dozen pairs of cuffs or anklets per minute. Samples on request.

Branch Shop, Amsterdam, N. Y, Philadelphia Office, "The Bourse," Room 435.

European Office, 15 Newarke St., Leicester, Eng.

C. J. SIBBALD, General Representative,
757 River St., Troy, N. Y.
Telephone No. 547-M.

G. E. PARKER, Representative,
Philadelphia, Pa.

Perfect Fast Black for Hosiery

The "Dubois' Sanitary" Oxidized Fast Black Dyeing Process with the Lisle Thread Silk Finish, Patented March 17, 1903, and The "Dubois Sanitary" One Dip Fast Black in Powder Form, Leads Them All!

This is the most reliable dyeing formula known to fast black dyers. It has been adopted successfully by many leading mills. It always gives uniform shade, oxidizes well and the fabric is almost as strong as though dyed with direct colors. Most important of all, it gives a fine lisle thread finish without in the least tendering the goods. Beware of cheap fast black formulas, which are sure to be dearer in the end.

The cost of the Dubois black, the best in the market, is very reasonable, as low as $1.40 per 100 pounds dyed in ordinary black for cheap trade, and not over $2.50 per 100 for the very best black for high grade goods, guaranteed to be ungreenable to acid tests and wear. Manufacturers of knit goods, hosiery and job dyers ***take notice*** that I am prepared to give licenses with full instructions for producing lisle thread finish (processes patented March, 1903) on any kind of direct colors or fast black, either before or after dyeing or bleaching.

Sulphur and diamine blacks particularly are so much improved after having been lisled by my patented process that they look just as well as aniline oxidized fast black, and yarn costing 17 1-2 cents per pound will produce as fine a looking fabric treated by my process as the genuine lisle thread at a cost of 34 cents per pound. This is a boon for direct color job dyers and bleachers, as well as for manufacturers of hosiery and knit goods.

The license will be given on a small royalty per 100 pounds.

All the machines used for the fast black and lisle thread finish, also for giving lisle thread finish to direct colors on bleached or unbleached goods are of my own invention, and are

PATENTED AS FOLLOWS:

June 18, 1901. Rotary oxidizing apparatus. The only machine in the world that carries the goods while oxidizing and lisling at all points of the compass. Quickest oxidizer known.

September 9, 1902. Rotary yarn oxidizing apparatus. Also carries the yarn at all points of the compass while in process of oxidizing or steaming.

June 10, 1902. A stationary hosiery oxidizing apparatus. Two different speeds. Especially constructed for lisle thread finish on hosiery or knit goods, equipped with an electric thermometer for the accurate measurement of the dry and wet hot air.

December 10, 1900. Stationary hosiery oxidizing apparatus. Two speeds. Chain and sprocket wheel drive with double clutch to start and stop. Very strong for heavy work, also built for lisle thread finish.

ALSO NOTICE:- That My One Dip Sanitary Fast Black in Powder Form is the same black as the Sanitary Oxidize Fast Black Process mentioned at the head of this advertisement, and is a long felt want among the trade, particularly for small concerns whose production would not warrant the equipping of an Oxidize Fast Black Dyeing plant.

This One Dip Sanitary Fast Black is dyed in the open ordinary dye tub at boiling heat in one hour, then washed and softened, if desired, as is done with all other direct colors for cotton hosiery, and has the advantage on the other direct blacks to allow the production of any shade desired from a jet to a very blue black, and matching well the oxidized aniline black.

The cost per 100 pounds hosiery dyed with this black is from $3.50 to $3.80 according to amount of softener used.

This One Dip Sanitary Black is positively guaranteed to be ungreenable to acid test and wear and leave the fabrics as strong after dyeing as it was in the white.

The apparatus required to start dyeing are but two ordinary wood dyer's tubs and one hydro-extractor.

Those wishing to put on their goods so dyed my "Lisle Thread Finish" (Patented) can do so by simply adding to above apparatus one or more of my "Stationary Oxidizing Machines" (Patented June 10, 1902), and take out a license for the use of my patent for lisle thread finish on vegetable fabrics, which will be given free of charge, and all you will have to pay for the use of the machine and the lisle thread finish process, will be but a small royalty for each 100 pounds hosiery given the lisle thread finish.

Dyers and manufacturers that are far away may procure a license with full instructions for building the machines economically, paying a small royalty for the use. I have made the royalties low, so that ***no one may be debarred by reason of the price,*** but I mean to protect my patents and will vigorously prosecute any who infringe.

Fast black dye and bleach plants for hosiery, underwear and skein fast black yarn dyeing, installed and equipped complete, if desired. Apply to

A. N. DUBOIS, 2170 Sedgeley Ave., Phila., Pa. **or KEYSTONE LAW and PATENT CO.,** Betz Bldg., So. Broad and Market Sts., Phila., Pa.

Builders of
Steam Presses,
Oxidizers,
Chromers,
Tom Toms,
Pumps,
Extractors.

Hosiery and Laundry Dryers.

Complete Dye Plants Erected.

WILFRED WELLS,

Sole Manufacturer of the

CHAMPION HOSIERY STAMP.

PATENTED JANUARY 7, 1896.

The Only Perfect Stamp for Hosiery, Underwear and all Woven Fabrics. BLOCKS FOR PRINTING HOSIERY.

505 W. Lehigh Avenue, . . . PHILADELPHIA, PA.

A. McMICHAEL,

Machinist,

Repairs to Hosiery and Underwear Machines, Cylinders and Dials of every description.

FINE MACHINE WORK.

22 Armat Street, near Main, Germantown,

PHILADELPHIA, PA

We HARDEN all CYLINDERS and DIALS large and small.

BONNAZ MACHINES

FOR

HOSIERY EMBROIDERY

Of All Descriptions.

Automatic or Hand Operations.

PARTS AND SUPPLIES.

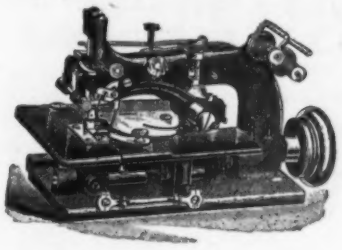
SOLE AGENT

JOHN FINK, - 201 CENTRE ST., NEW YORK CITY.

THE

Champion Rib Knitting Machines

For HOSIERY AND UNDERWEAR



Also Sewing and Trimming Machines, Crochet and Shell Machines, and all other Machinery required in the finishing of Hosiery and Underwear. Complete Plants Installed.

Estimates Cheerfully Given.

Our New Overseaming Machine.

CHAMPION MACHINE CO.,

N. W. Cor. American and Diamond Sts.

PHILADELPHIA.

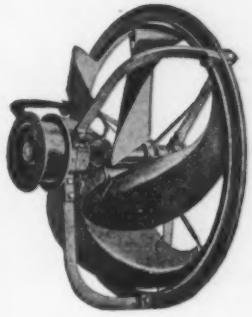
CRANE MFG. CO. Lakeport, N. H.

Spring Needle Circular

KNITTING MACHINE.

For Hosiery, Shirts, Drawers, Jersey Cloth and Stockinet.

A Specialty of Hardened Bladed Burr Wheels with Self-Oiling Brackets.



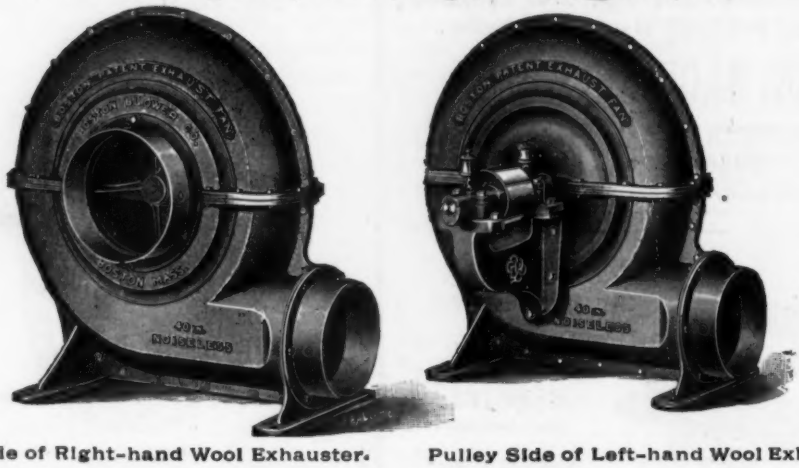
We build our Davidson Fans to rotate to the right or left—with shaft to run in horizontal or vertical postion—bearings are self-oiling in every case, with "ball-bearing" thrust collar against the rear box. We build from fifty to sixty styles to be driven either by belt, direct attached engine or motor. We will send you our Catalogue 50A for the asking.

MASSACHUSETTS FAN CO.,

WALTHAM, MASS.

Boston Wool Exhausters, with Removable Tops.

As used in Connection with Pneumatic Conveyor System for Handling Wool, Cotton, Rags, Excelsior, Jute, etc.

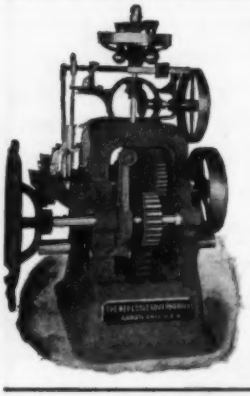


Inlet Side of Right-hand Wool Exhauster. **Pulley Side of Left-hand Wool Exhauster.**

This machine is similar in design to the regular Boston Patent Exhaust Fan, but is fitted with a special wheel for handling fibrous materials, and the top is removable.

This latter feature is especially desirable when handling wet or greasy materials or in handling anything, in fact, which would leave a deposit on the inside of fan, as the entire top may readily be removed for inspection or cleaning without disconnecting either pipe or belt connections.

BOSTON BLOWER CO., Main Office and Works: **Business and Glenwood Sts., HYDE PARK, MASS.**



WATERWHEEL GOVERNORS

FOR TEXTILE MILLS
Electric Light, Power and Railroad Work

We are now prepared to **guarantee absolute satisfaction.** Write for references in your locatity.

THE REPLOGLE GOVERNOR WORKS

Broadway and Chestnut Streets, **AKRON, OHIO.**

WATER WHEELS

FOR ALL HEADS FROM 3 FEET TO 2000 FEET.

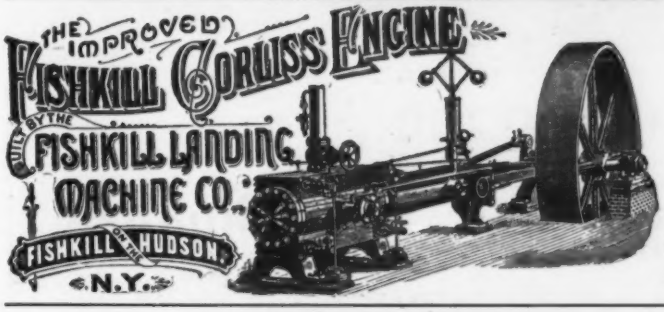
Adapted to all **POWER** Purposes. Easy working balanced gates. We guarantee greatest power with smallest quantity of water, at both full and part gates.

State Head and Power Required.

AUTOMATIC ENGINES

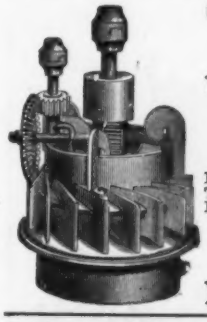
10 to 50 H.P., guaranteeing best possible regulation with highest economy in steam. Pamphlet of either Wheel or Engine sent on application.

JAMES LEFFEL & CO., Springfield, Ohio, U. S. A.



Most Efficient and Economical Power in the world For Textile Mills.

It has NO EQUAL for Close Regulation and Noiseless Operation. Send for Catalogue.



TURBINES ON HORIZONTAL AND VERTICAL SHAFTS.

These wheels are specially designed and adapted to **TEXTILE MILLS**

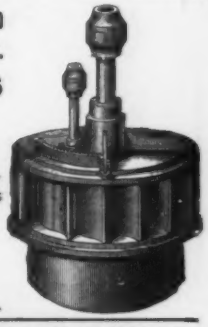
The records of the Risdon Wheel are not equaled by the records of any other wheel. Average of results of tests in Holyoke Flume: Full Gate, .8694; Seven-eight, .8472; Three-quarter, 8014; Five-eighth, .7601.

RISDON CELEBRTAED TURBINES. ALCOTT HIGH DUTY TURBINE. Unequalled Efficiency. Easy Working Gate. Greatest Power from a Limited Quantity of Water at Smallest Cost.

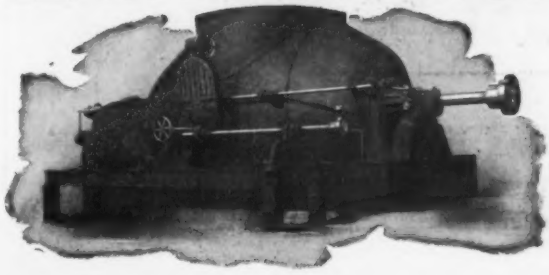
TAYLOR SLEEVE GATE TURBINE. The largest power ever obtained from a Wheel of the same diameter.

SEND FOR CATALOGUE.

RISDON-ALCOTT TURBINE CO. Mount Holly, New Jersey, U.S.A.



PAIR McCORMICK TURBINES

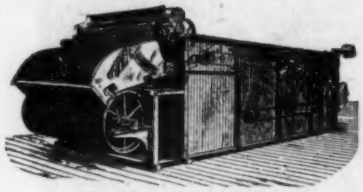


4,000 H.P., 85 ft. head, arranged to drive generator and a single turbine to drive exciter. Five settings built for the Hudson River Water Power Company's Spier Falls plant and 14 pairs 51 inch for their plant at Mechanicsville, N, Y.

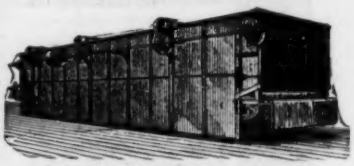
Write for Catalogue if contemplating purchase of turbines.

S. MORGAN SMITH CO.
YORK, PA.
Boston Office, 176 Federal Street.

DEC 16 1903



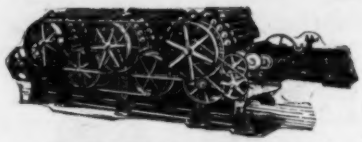
Automatic Cotton Stock Dryer.



Automatic Yarn Dryer.

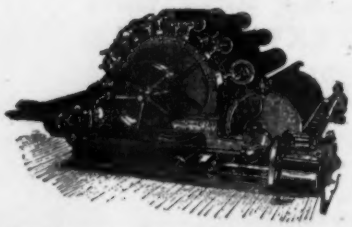
"CYCLONE" DRYERS

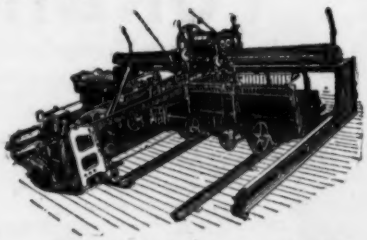
For Cotton Stock, Wool Stock, Rags,
Yarn, Cloth, Underwear, Stockings, Etc.



"PROCTOR"
Garnett Machines and Pickers

For reducing to fibre Cotton and Woolen
Waste, Cloth Clippings, Etc.





"FURBUSH" Woolen Mill Machinery

Including Pickers, Cards, Mules, Twisters,
Warpers, Dressers, Spoolers, Etc.

Manufactured by

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This KENNICOTT WATER SOFTENER effects a saving of 60% in soap. Has overcome frequent necessity of re-scouring and dyeing. Goods now produced feel softer, loftier, and are cleaner, brighter and more perfect and better appearing than before. They are entirely free from that harshness and wiry feeling experienced prior to use of softened water.

KENNICOTT WATER SOFTENER AT THE
MANKATO WOOLEN MILLS, MANKATO, MINN.

We solicit your inquiry and shall be pleased to forward full particulars together with our latest treatise on Water Softening upon request.

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Cable Address, "WATERSOFT," London.

JAMES SMITH WOOLEN MACHINERY CO.

411 to 421 Race Street, Philadelphia.

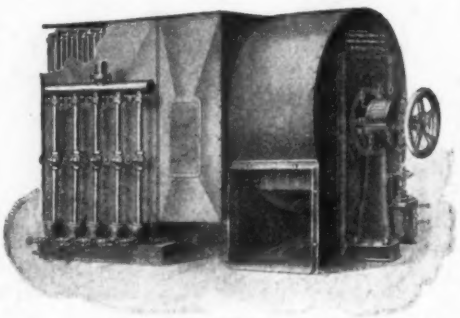
Woolen Machinery

FOR

Carding, Spinning, Wool Washing, Carnetting, Pickering, Drying, Burring, Cleaning, Finishing.

Cotton Batting and Waste Machinery.

FOR MORE COMPLETE LINE SEE PAGE 89.



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No press-offs from knots, over-winds, etc.

The only perfect system of winding yarn for knitting purposes.

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